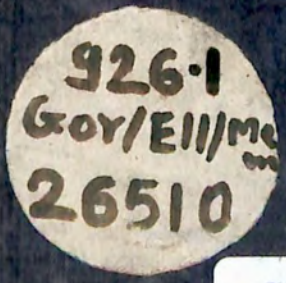
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MEMOIR

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LIFE AND WRITINGS

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JOHN GORDON, M.D. F.R.S.E.

LATE LECTURER ON ANATOMY AND PHYSIOLOGY
IN EDINBURGH.

BY

DANIEL ELLIS, F.R.S.E.

&c. &c.

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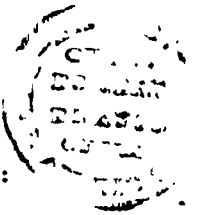

EDINBURGH:

PRINTED FOR ARCHIBALD CONSTABLE AND CO.
AND HURST, ROBINSON, AND CO.
LONDON.

1823.

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Printed by J. Hutchison,
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TO

JOHN THOMSON, M.D.F.R.S.E.

&c. &c. &c.

DEAR SIR,

PERMIT me to inscribe to you this Memoir, written chiefly on your suggestion, and indebted to you for much of the information it contains. As the 'guide, philosopher and friend,' of the lamented individual whose brief history it records, no one possessed equal opportunities of observing his conduct, or watched his progress in life with greater pride and pleasure. To you he owed counsel and assistance in all his studies and pursuits; and by your example he was formed to those habits of patient industry, and that emulous zeal for knowledge, which led him on, with assured step, to the eminence he so early obtained. To no one, therefore, can this record of his life prove

more interesting, nor can any one better appreciate its general propriety and truth.

It was not without much hesitation and diffidence that I undertook this melancholy duty: But if you, and those who hold in honoured remembrance the name of our friend, shall approve my humble endeavour, it will yield me the truest satisfaction. And while I feel proud in thus associating my name with his, I rejoice in the opportunity afforded me of declaring the very high respect and regard with which I have the honour to be,

DEAR SIR,

Your very faithful,

and obedient Servant,

D. E.

JANUARY 1st, 1835.

MEMOIR, &c.

JOHN GORDON, M.D. was the third son of John Gordon Esq. of Edintore, wine-merchant and banker in Forres, and was born in that town on the 19th of April 1786. His mother was Elizabeth Arnot, daughter of James Arnot, Esq. of Dalwhatswood, in the parish of Loudon, Ayrshire; a gentleman who, to his other occupations, added that of factor to the Earl of Loudon, and enjoyed much of his confidence. After receiving the first rudiments of domestic education, Dr Gordon was placed under the tuition of Mr Shand, a teacher of considerable eminence, then residing at Forres, but, at present, Rector of

the Academy at Tain. Under this gentleman, he began the study of the Latin language, in the grammar school of Forres, in November 1793, where he continued, applying to the acquisition of the learned languages, and of writing and arithmetic, till the end of the year 1799, when he was removed to the University.

On his arrival in Edinburgh, he resided with his eldest brother, the late Robert Gordon, Esq. writer to the signet, who, in every thing that related to his welfare and improvement, manifested, on all occasions, the anxiety of a father. Having entered at the University, he prosecuted his classical studies under the late Dr Hill and Mr Dalzel, who, at that period, filled respectively the Chairs of Humanity and Greek. At the same time, he began the study of Mathematics under the late Mr Laidlaw, well known as an able and successful teacher; and with him he continued about two years.

Being destined to the profession of Medi-

cine, he had the good fortune to commence his studies in that science, under the auspices of Dr Thomson, Professor of Military Surgery in this University, with whom he became an apprentice in the year 1801. 'In 'that capacity,' says Dr Thomson, (in a communication with which he favoured me), 'he continued to prosecute, under my direc- 'tion, his general and medical studies for a 'period of four years. While serving with 'me, he had the good fortune to have for his 'fellow-apprentices, several young men, e- 'minently correct as himself in moral con- 'duct, equally anxious to distinguish them- 'selves by diligence in study, and to merit 'my approbation by a strict attention to 'their duties. In the discharge of the mul- 'tifarious little offices which young men, in 'the situation of apprentices, have to per- 'form, no one has ever appeared to me to 'possess, in an equal degree with Dr Gor- 'don, the power of executing what was in- 'trusted to his care. The performance of

'his duties never seemed to give him any 'trouble; and nothing could exceed the 'punctuality with which they were discharged.'

Soon after this period, Dr Gordon began his attendance on the medical classes in the University; and he farther availed himself of the other opportunities of medical instruction which the school of Edinburgh affords, by attending, in succession, the lectures delivered on Anatomy by Dr Barclay; on Surgery by Dr Thomson; and on Chemistry by the late lamented Dr Murray; men who, by their labours and writings, have largely contributed to uphold the reputation which Edinburgh, as a medical school, continues to enjoy. * During this period too, Dr Gordon

* The name of Dr Murray recals so many recollections, that I cannot deny myself the gratification of paying a slight tribute of respect to the memory of one whose friendship I so highly valued. By the steady exertion of eminent talents, he had earned a distinguished reputation; and, to the sincere regret of all who knew him, closed a life of great activity and usefulness at an age when he was best qualified to enjoy and augment his fame.

became a student of Natural and Moral Philosophy, the former taught, at that time, by the late Mr Robison, and the latter by Mr Dugald Stewart.

For more than twenty years he delivered Lectures on Materia Medica and Chemistry, in this city, with the greatest applause; and, as well by the Works which he published, as by his Lectures, advanced greatly the sciences which he cultivated and taught. As a teacher of Chemistry, he possessed very peculiar powers. Profoundly skilled in the science, he exhibited unrivalled facility in the communication of it. The ease, clearness, and fluency with which he spoke were truly surprising. There seemed to exist within him a perennial spring of thought, which, without effort or parade, poured itself forth in one continued stream of perspicous expression. His mind, indeed, was so active, and he put so much of it into all he said or did, that he kept every other mind on the alert also. This rare and genuine talent was accompanied in him by a simplicity of character almost as rare, and not less truly genuine. He had nothing within or about him that repelled approach, or kept at a distance those who might desire information. On the contrary, he was all frankness, courtesy and ease—ever ready to advise or instruct his pupils—to listen to their difficulties, clear up their doubts, and encourage and aid their private efforts at improvement. From these various causes, no teacher of his time possessed a higher reputation for talent with his pupils, was more sincerely respected by them, or will live longer in their grateful remembrance.

In the year 1803, Dr Gordon was elected a member of the Medical Society—an Institution highly favourable to the development of talent, and contributing, in no ordinary degree, to that inquiring disposition, and independent mode of thinking on medical sub-

It was only towards the latter years of his life, that he had leisure to devote much time to original investigation; and then, unhappily, disease had made such inroads on a frame naturally delicate, that nothing less than a mind of unusual activity and vigour could have borne him through the labours which he actually accomplished. His beautiful experiments on the communication of heat through liquids; and his new views on the composition of mineral waters, derived from an examination of the modes in which the ordinary results of analysis may be modified in the successive stages of the process, are well known to chemists, and afford ample evidence of the acuteness with which he contemplated the phenomena of the science, and the skill and ability which he exerted in removing its imperfections: While his discussions on the prevailing theories of Geology; on the nature and relations of Oxymuriatic Acid; on the theory of Acidity; and, more especially, the philosophical views of chemical doctrine exhibited in his excellent 'System of Chemistry,' do equal credit to the depth and extent of his knowledge, and to his talent for arrangement and generalization in the most difficult departments of the science.

jects, which have ever been leading characteristics of the Edinburgh school. This Society arose out of a private meeting of medical students, who, so far back as the autumn of the year 1734, assembled, at first once a fortnight, to read an Essay, written by one of its members, on some subject connected with their studies. Of these students Dr A. Russel, the natural historian of Aleppo, and Dr George Cleghorn, author of a well known work on the Diseases of Minorca, were among the most distinguished. The following year, viz. 1735, Dr John Fothergill and Dr Cullen became members of it; and thus this private meeting laid the foundation of the Medical Society, which became more formally incorporated the year after, and has flourished ever since to the great advancement of medical science in this University. *

In this Society, all subjects connected with medical science are submitted to the freest discussion, without any other reserve than

* History of the Medical Society. Edinburgh, 1820.

that which the necessary rules of debate impose. The prevailing opinions in medicine are canvassed with the utmost freedom, and the students may be said often to sit as jurors on the doctrines even of their teachers. If the confidence and inexperience of youth sometimes betray into error, it is likely, at least, to be less permanent than that which results from the timidity and prejudice of age. Hence it has happened, that opinions and theories in medicine have been gravely delivered from professorial Chairs long after their fallacies had been detected, and their principles abandoned by those to whom they were addressed. 'At the establishment 'of the Medical Society,' says a venerable member * of that Body, 'the system of Boer-'haave maintained in Europe a sway as uni-'versal as that of Galen had done before. 'But the founders of this Institution, while 'they were far from being the least sensible 'of the high merit of so great a master, did

* Dr Duncan, senior.

'not hesitate to shake off a blind veneration 'for his errors. Reason, philosophy and ex-'perinent were their constant, and their only 'guides. By these means, by such men, 'and in this place, were the foundations of 'the Boerhaavian doctrine first shaken.' Of these men, the most distinguished was the illustrious Cullen, who embraced early the doctrines of Hoffman, and, in the year 1755, when he succeeded to a Medical Chair, first publicly taught them in this University, at a time when the system of Boerhaave still subsisted in its full and entire force. At a still later period, Dr Cullen himself advanced a system which superseded that of his great predecessors; and again, in this Society, this new system, even during the lifetime of its author, first encountered that opposition which made it 'totter to its fall'—a fate which shortly overtook the system of Brown that had supplanted it, and for a time bore almost undisputed sway. In the proceedings and discussions of this society, Dr Gordon

distinguished himself as well by his knowledge and ingenuity, as by the ease and gracefulness of his elocution. He read before it, at different times, the allotted number of dissertations; all of which exhibited that patient research and discriminating judgment which marked his subsequent efforts.

Dr Gordon's studies were originally directed with the view of his filling a medical station in the service of the East India Company. In prosecution of this plan, he went through the usual examinations, and obtained a diploma from the Royal College of Surgeons of Edinburgh in the spring of 1805; and on the 24th of June of the same year, he proceeded to the degree of Doctor in Medicine in the University.

In conversations with Dr Gordon about this period, Dr Thomson found that he was by no means bent on going to India; and that, in his contemplation, the measure seemed to be a matter rather of necessity than of choice. From the opportunities he had pos-

sessed of witnessing the talents of Dr Gordon, his more favourite pursuits, and the diligence which he displayed in the prosecution of them, it occurred to Dr Thomson to suggest to him the idea of his becoming a lecturer on Anatomy and Physiology in Edinburgh. This idea he readily embraced, and at once set about endeavouring to persuade his friends to abandon the plan of his going out to India. So entirely was he satisfied with this change of plan, and so eager to enter on the new career suggested to him, that he began immediately to study Anatomy, and practise Dissection, with the view of qualifying himself to teach that fundamental branch of medical science. The better to accomplish this object, he determined to spend a winter in London, where the facilities of studying practical anatomy are much greater than can be commanded here. He accordingly set out for the British metropolis in the winter of 1805; and having, as appears from his letters to Professor Thomson, visited all

the great hospitals, and made particular inquiries respecting their establishments for dissection, his choice for the study of anatomy, was fixed on the Theatre in Great Windmill Street, to which Dr Baillie and Mr Cruickshank formerly gave celebrity; and which, at this time, was under the able direction of the late Mr Wilson. 'These dissecting rooms,' says he, 'seem so well supplied with subjects, 'are apparently so comfortable, and the pu-'pils are so much to my mind, that I have 'resolved to become one of the party.' Of these pupils, many were his countrymen and acquaintance; and with them he prosecuted his anatomical studies with unwearied assiduity. He always estimated highly the instruction he had gained, and spoke even of the pleasure he had received, from attendance on Mr Wilson's Lectures. In a letter dated February 1806, he says to Professor Thomson,—'Mr Wilson has given an interest to osteology of which I could hardly have conceived it susceptible; and his lectures on

muscles and their actions, with which he is now occupied, are very far superior to any thing on that subject I have ever heard or read.' No greater praise can be rendered to a public teacher than that of imparting interest to those parts of his lectures which are the least susceptible of it; and the student who can be thus pleased with the least attractive portion, is in the best disposition to derive the greatest improvement. In this school too, Dr Gordon became acquainted with Mr Brodie, then acting as demonstrator in Mr Wilson's rooms, and with that distinguished physiologist he continued ever after to cultivate an intimate correspondence. At the same time, he attended lectures on Comparative Anatomy by Dr Macartney, whose subsequent removal to Dublin has contributed so much to the rising reputation of that University, as a medical school.

But although chiefly devoted to anatomical pursuits, during his residence in London, Dr Gordon's letters show that no subject con-

nected with medical literature, or the practice of medicine or surgery, escaped his notice. He details information of every kind, and describes many important operations which he had witnessed by the eminent surgeons attached to the different hospitals of the metropolis. He returned to Edinburgh in the summer of 1806, and, through that summer and the succeeding winter, prosecuted with great zeal his preparatory studies for the duties he was about to undertake.

In November 1806, he was elected one of the Annual Presidents of the Medical Society—a distinction that is commonly desired with earnestness, and for the most part fairly bestowed, by a free election, on those best entitled to the honour. In this office, I had the good fortune to be associated with him, and the increased intercourse which, in consequence, arose between us, soon ripened an occasional acquaintance into a sincere and permanent friendship. The circumstance too of my having cultivated a small portion

of that field of science in which he exerted himself with so much ardour, served to increase the interest we took in each other's pursuits, and to multiply the occasions of bringing us together. He who has himself been engaged in the doubts and perplexities of original inquiry, can best estimate the value of a friend, ready, at all times, to hear with patience, and discuss with candour, the yet immature views presented to him;—to correct with delicacy what may be erroneous—with honesty to suggest what may be deficient—and zealous to approve that which may be just and true. Such was the friend I had found in Dr Gordon, and such too, alas! is the one I have lost by his death.

In the year 1807, Dr Gordon became an inmate in Dr Thomson's family, in which he continued to reside for several years. Looking forward to his future establishment, he had no reason to expect any material assistance from his father; and thrown thus, at his very outset in life, on the resources of his

own talents and industry, he was animated to exertion, as well by the necessities of his situation, as by his zeal in the pursuit of knowledge. During the summer of this year, on the suggestion of Dr Thomson, he gave, by way of trial, some demonstrations in Osteology to a few of his particular friends. The easy style of delivery, the accuracy of statement, and methodical arrangement of these demonstrations, soon satisfied his friends that he possessed every qualification necessary in a teacher of anatomy. Encouraged by the approbation he received, he announced, in December of the same year, a course of public demonstrations in anatomy, which was attended by a small number of pupils. The following winter, to his lectures on Anatomy, he added a short view of Physiology; and he continued to teach those subjects in connexion for several years.

Being now established in Edinburgh as a Lecturer on Anatomy, Dr Gordon who, as before mentioned, had already obtained a

diploma from the Royal College of Surgeons, was desirous of becoming a member of that Body. With the usual forms he was accordingly admitted a Fellow in October 1808; and, in conformity with the regulations respecting the admission of ordinary members, he, on this occasion, chose for the subject of his "Probationary Essay" the "Dislocations of the Thigh-Bone." Much difference of opinion has prevailed among surgeons on many of the points connected with this serious accident, namely, on the several directions in which the head of the bone may be dislodged from its socket;—on the position which it then occupies on the bones of the pelvis;—and on the condition of the ligaments, and especially of the muscles, of the part concerned. To ascertain these several points, Dr Gordon not only studied the cases recorded by practical writers, but had recourse to experiments on the dead body, with the view both of verifying the accuracy of their descriptions, and rectifying the discordance

that existed among them. Many surgeons have made artificial imitations of luxation on the dried bones of the pelvis and femur, or on the recent bones when deprived of their investing muscular substance. Such experiments, however, are fitted only to indicate the obstacles to reduction, from certain prominences, and depressions in the bones themselves; but not to determine, amidst the violent derangement that has been induced, the resistance opposed by muscular action. To discover, therefore, what muscles contributed to retain the head of the bone in its displaced situation, and what were most calculated either to oppose, or to favour its return, Dr Gordon produced artificially, on the dead body, the several varieties of luxated femur that occur in practice. Previously, however, to these operations, the soft parts surrounding the articulation were exposed by dissection; so that he might be able to mark at once the efficiency of certain parts in resisting luxation, the position which the head of

the bone occupied when the luxation had taken place, and the derangement induced among the muscles. So correctly did this artificial imitation on the dead body correspond with the dislocations that occur in the living subject, that it was found exceedingly difficult, if not altogether impossible, to produce artificially, any other species of dislocation than those which actually present themselves in practice; and the external character of the real accident in the living body, and of its imitation on the dead one, always corresponded closely with each other.* Information thus sought, coupled with accurate observation of the external appearances of the parts, could not fail to improve the means of discriminating the varieties of dislocation to which this joint is exposed; to impart correct notions of the actual position of the displac-

* It appears, that Professor Bonn of Amsterdam, (referred to by Professor Turner, in his 'Probationary Es-'say' on the dislocations of the Shoulder-joint, Edinburgh, 1812), had previously employed a similar mode of inquiry, in relation to that joint.

ed bone, and especially to exhibit the state and condition of the several muscles, whose relative situations and actions suffer, in these accidents, such great derangement;—all of them circumstances which lead at once to clear conceptions of the real nature of the accident, and suggest the readiest and most effectual modes of relief. This Essay was inscribed to his friend, the late Mr Allan Burns, Lecturer on Anatomy and Surgery in Glasgow, whose uncommon zeal and industry in his professional pursuits were well known to the public, and rendered his premature death a subject of deep regret to all who knew his talents and his worth.

Dr Gordon continued his studies and his lectures for several years with increasing success, till his rising reputation pointed him out to its late illustrious secretary, as worthy to become a member of the Royal Society; and on the honoured recommendation of Mr Playfair, he was accordingly admitted in January 1812. Soon afterwards, he com-

municated to Professor Dugald Stewart some very interesting observations on the case of James Mitchell, a boy born blind and deaf, which were subsequently read to the Society, and published in its Transactions.

In the summer of this year, 1812, Dr Gordon quitted the family of Dr Thomson, on his marriage with Miss Rutherfurd, which took place in the month of June; a connexion which, having been long founded in mutual esteem and affection, and cemented by similarity of tastes and dispositions, realized, through the remaining period of his life, his fondest anticipations, and satisfied his highest hopes. By this lady he had four children, of whom one son and two daughters survive their father.

In the year 1814, he was a candidate for the situation of one of the junior surgeons of the Royal Infirmary; and, aided by the reputation he had now acquired as a teacher of anatomy, he was in consequence elected. By the regulations of that Establishment at

that period, the senior surgeons executed the duties of attendance on the sick, and performed the capital operations; while to the juniors was assigned the duty of acting in the absence of the seniors, of assisting them in their operations, of visiting the patients who require surgical aid in the medical wards, and of preparing for exhibition such cases of morbid dissection as occurred in the hospital, and might be deemed interesting for the illustration of disease. For this latter office, Dr Gordon's previous acquirements eminently fitted him, and it is often one of considerable difficulty and importance. The simple exhibition indeed of a morbid part is frequently a matter of no great difficulty; but to display it, when distorted by disease, in the manner that shall best exhibit its altered state;—to be able accurately to compare this state with that of the same part in health;—to trace minutely the changes of structure it has undergone, and discriminate truly between appearances merely casual, and those

which result from morbid causes—these require not only an experienced eye, but a practised hand, and a mind ready and sagacious in extracting, from the appearances observed, the true indications they afford. Physicians, for the most part, are so much occupied with *general* notions of disease, and have so slight an acquaintance with practical anatomy, that they are apt to undervalue, or unable fully to appreciate the information which morbid dissections supply; yet the success and reputation of Morgagni and Lieutaud in former days, and of Baillie and Farre in our own, may suggest, that not the profession only, but the public also, know how to appreciate such labours. Too often indeed, it must still be confessed, morbid dissection fails in affording the information expected from it; for, sufficient as our knowledge of anatomy may have become for the purposes of the operative surgeon, the physiologist and pathologist must continue to lament its imperfections, considered in relation to the functions of the system in health and

disease. Nevertheless, a deep sense of the importance of morbid anatomy, to the improvement not only of practical medicine, but of physiology, rendered Dr Gordon always eager to embrace opportunities of morbid dissection. How much to the satisfaction of his Colleagues in the Infirmary, he performed this duty, may be learned from the honourable tribute rendered to his memory by Dr Duncan junior, in his late valuable 'Reports of the practice in the Clinical Wards of the Royal Infirmary of Edinburgh.'—'The dissections contained in the Appendix to these Reports,' says Dr Duncan, 'I consider very valuable. To me they are particularly interesting, as being the last fruits of my professional intercourse with the late Dr John Gordon, whose zeal and science as a pathological anatomist, qualified him so eminently for the situation he filled in the Hospital, and whose private virtues made him most beloved by those who knew him best.' *

* Reports, &c. p. 51. Edinburgh, 1818.

From the time that Dr Gordon began to lecture on Anatomy, he resolved to endeavour to supply a want, which he had himself felt as a student of that science. This was an accurate and scientific elementary work on Anatomy, which should not only exhibit a full view of the science as taught in this country, but embrace also the latest discoveries and improvements of the Continental Anatomists. To say nothing of the information to be found in the various detached Essays published on the Continent, we have no elementary work, which, in point of extent and accuracy, can be compared with those of Mayer, Hildebrandt, Loder, Sömmerring, Portal, or Bichat. To select, arrange, and combine the valuable materials contained in the writings of these, and other Continental anatomists, and, as far as possible, to verify their accuracy and make them his own by the most minute and scrupulous investigation, was the unceasing object of Dr Gordon's labours. All his dissections, with this

view, were made with the works of the best systematic authors lying before him; and, in addition to these, he had constant recourse to the particular works of Albinus, Haller, Meckel, Wrisberg, Prochaska, the Wenzels, Reil, Mascagni, Scarpa, &c. authors whose discoveries and improvements have not yet been fully incorporated with British anatomy.

In prosecution of this design, Dr Gordon published, in the year 1815, the first volume of a work, entitled, 'A System of Human Anatomy.' The descriptions and facts contained in this volume, he states to be, in most instances, the result of observations and experiments made directly on the human body by himself; but as to those subjects which he had not hitherto enjoyed opportunities of investigating to his own satisfaction, he has referred to the observations of others, on whose accuracy he placed the most reliance. The work throughout, is purely anatomical, without any admixture of physiological matter;

and was intended, by the author, as a manual for his Public Lectures.

In a short introductory chapter, the author gives, what he considers, a just distinction between bodies called Living and Dead. Those bodies he regards as Living, in which a certain appropriation of foreign matter is going on; and those as Dead, in which this process has either ceased, or never existed. Living Bodies, as every one knows, are divided into two great classes, Animal and Vegetable;—those being, in a general way, denominated animal, which appear capable of sensation and ideas; and those vegetable, which do not seem susceptible of these phenomena.

He next proposes to denominate the science which treats of Living Bodies, VITAL ECONOMY; which divides itself into two parts, *Animal* Economy, and *Vegetable* Economy; each of which comprehends two distinct objects of investigation, Anatomy and Physiology. Animal Anatomy is further divided into Human and Comparative, or that which

treats of man only, and that which compares the structure of animals with each other, and with man. The work before us was confined to Human Anatomy alone.

The arrangement adopted in this work differs, I believe, from any that has preceded it in this country. The human body, as is well known, consists of a vast variety of organs, which in form, size and structure, differ essentially from each other. These diversities however arise, not from differences in the simple or elementary parts which compose them; but chiefly from the varied modes and proportions in which these parts are combined and arranged. The primary parts themselves are few in number, and common to almost all the compound organs; and hence the author proceeds to exhibit, in the first place, a general account of them. With this view, he divides the materials of this volume into two parts—the *first* of which treats of the External Form, the Stature, and Weight of the body;—and the *second* delivers

the anatomy, in general, of the Common Systems and Common Textures.

By the common systems, are understood those three great elementary parts which enter into the construction of particular organs, and are usually denominated the Vascular, the Absorbent, and Nervous systems. Under these heads, therefore, the author treats successively of the heart and blood-vessels—of the absorbent vessels, and the glands attached to them—and of the brain, the spinal cord, and the nerves.

Of these elementary systems, various *textures* are composed, some of which are distributed very generally, and others almost universally, through the body. They serve principally, either to connect together the elementary organs, to cover and protect them, to give form and stability to the body, or to promote and facilitate its movements. In succession, therefore, they are treated of under the titles of the Anatomy of Cellular Substance and Adipose Substance; of Muscle,

of Skin, and of Hair; of Cartilage, of Bone, and of Tendon; and the volume concludes with the Anatomy of Serous and Synovial Membrane.*

Such are the subjects of this first volume, which contained only *two* of the *eight* parts which the whole work was designed to embrace. The remaining six parts would have treated successively of the anatomy of the Skeleton, and of the Muscles as attached to

* The ancients, says M. Magendie, believed all the solids capable of being reduced, in the last analysis, to a simple fibre; an idea admitted by Haller, who regarded this fibre, however, as invisible, and cognizable by the mind alone. By modifications of this simple fibre, secondary fibres, which received particular denominations, were held to be formed. M. Pinel is said first to have conceived the idea of distinguishing the organic solids, not by fibres, but by tissues or systems. This idea was adopted by Bichat, who applied it to all the solid parts of the body. It has subsequently received correction and improvement from Dupuytren and Richerand, who enumerate eleven primary tissues or systems, which, by their association with one another, and with the fluids, compose the several organs or instruments of life.—*Precis. Elem. de Physiologie*, t. 1. *pp.* 8, 9, 10.

it; of the several Viscera of the body; of the Integuments which invest it; and of the Blood-vessels, Absorbents, and Nerves, as distributed to individual parts and organs. The methods of inspecting the body after natural or violent death, the process of Embalming, and the modes of preparing and preserving parts for anatomical uses, with directions for a course of Practical Anatomy, would have been subjoined; and the work was destined to terminate with an Historical View of the science it had previously detailed.

For this comprehensive plan, the materials were in great part provided. Every writer within his reach, whether systematical or particular, it was the author's desire to consult; but it was also his wish to verify, as far as possible, the accuracy of their descriptions, and to make them his own by actual examination. This conscientious desire to do the utmost justice to the subject, necessarily delayed the progress of the work. At the period, however, of Dr Gordon's death, the

greater part of the difficulties had been overcome. The third part, comprehending the Anatomy of the Skeleton, was announced for publication, and exists among his MSS. in a state nearly ready for the press; and, had the author's life been spared, the remaining parts, which were in great forwardness, would have followed at no distant intervals.

In an elementary work of this kind, the chief merit must consist not in original discovery, but in the general plan and arrangement of the materials, and the perspicuity and precision with which the subject is treated. To me it appears, that the arrangement adopted in the present instance is entitled to great praise. The reader is first made acquainted with the simpler parts, and proceeds gradually to more complex structures, which enables him to follow with greater facility, and to appreciate more justly, not only their general relations, but the particular combinations into which they enter, and the uses they serve in the construction of other

organs. Nothing can exceed the general perspicuity and conciseness of the descriptive language employed by Dr Gordon in this work. He uniformly addresses himself to the eye, avoids all discussion of questions of doubt and opinion, and enters into minute details with a clearness and precision which those only who write from actual observation can command. Some parts, as those of the brain and nervous system, are very elaborately treated. The author had not only consulted all the best writers, but submitted, to the test of actual examination, the accuracy of every description connected with the anatomy of that organ. His descriptions of it will, therefore, be found much more minute than those of any preceding British writer. Some, perhaps, may regard them as too refined and elaborate, especially for an elementary work; and we think the convenience of the reader would have been consulted, had the subject been broken into smaller sections, instead of forming, as it now does, one continuous demonstration.

In his account of the Anatomy of the Common Textures, Dr Gordon dissents, in several particulars, from his predecessors in regard to the structure of the skin. This organ, as is well known, consists of two parts—the cutis, or true skin, which is a highly organized substance; and the cuticle, or scarf-skin, which, on the closest inspection, exhibits no appearance either of fibres, of vessels, or of nerves. In the true skin, the hairs are formed, and penetrate to the surface through the cuticle; and on certain parts also, small apertures, connected with the sebaceous follicles of the true skin, are visible in the cuticle: but, with the late Mr Cruickshank, Dr Gordon denies that any distinct pores are visible, either by the naked eye or the microscope, in the cuticular membrane—an opinion also maintained by Professor Rudolphi of Berlin.

Between the skin and cuticle, when separated from each other, delicate colourles filaments may be seen. These were regarded by the late Dr Hunter as vessels through

which the sweat was exhaled; and by Mr Cruikshank as fine processes of cuticle which lined the pores of the true skin; but, according to Dr Gordon, they are neither vessels, nor processes of the cuticle, but mere threads of mucous matter, which always form between the cuticle and true skin after death, in consequence of decomposition.

It is now more than a century ago since the illustrious Malpighi described a layer of substance, as intervening between the cuticle and true skin, to which was given the name of *corpus mucosum* vel *reticulare*. In the Negro, this substance was affirmed to be black, and of various lighter hues in the other varieties of the human race; and to its particular colour the varied complexions of the skin were generally ascribed. In the Negro, the Caffre, and the Malay, Dr Gordon satisfied himself, by many dissections, that a black membrane exists, to which the colour of black men is, no doubt, owing; but he was not able to find any light coloured *rete*

mucosum, corresponding to this black one, in the inhabitants of Great Britain, nor in those of other nations resembling them in colour. Doubts respecting the existence of a specific colouring matter in the white races of mankind, analogous to the black substance of the Negro, occurred also to Mr Lawrence; * and Professor Rudolphi † asserts, with Dr Gordon, that no such part as a *Rete mucosum* exists in white people. ‡

I have selected these few examples to show that Dr Gordon, in his anatomical pursuits, constantly examined for himself every subject that came under his notice; and that, with a due feeling of respect and observance

* Lectures on the Nat. Hist. of Man, p. 276.

† Edin. Phil. Journ. v. 1. p. 214.

‡ From a number of experiments, Dr Gordon also became convinced, that the alleged continuation of synovial membrane over the surface of articulating cartilages, (more than hinted at by Drs Nesbit and Hunter, and confidently maintained by Bichat), was altogether an anatomical *refinement*; 'and he believed the supposed' continuation of 'the 'tunica conjunctiva over the cornea of the eye, a *fiction* of 'the same kind.'—*Syst. of Anat.* vol. 1. p. 261.

towards others, he combined always that sagacity of observation, and soundness of judgment, which enabled him to improve on the labours of those who had gone before him. This work, the most important in which he had been engaged, Dr Gordon inscribed to his first and best friend, Professor Thomson, by whose counsel and guidance he had been directed in all his scientific undertakings, and towards whom he always felt and expressed the sincerest respect and gratitude.

THE next work of an anatomical nature from the pen of Dr Gordon, was called forth by the claims of two German physicians, whose alleged discoveries in the anatomy of the Brain, coupled with certain opinions as to the nature of its functions, had excited much interest in different parts of Europe. These gentlemen, after having made known their doctrines in the various Universities of Ger-

many, visited Paris, and exhibited to the Anatomists of that city their alleged discoveries. These so far excited the attention of the National Institute, that, in the year 1808, a Committee of five members, with M. Cuvier at their head, was appointed to examine and report on them. Accordingly, 'Drs Gall and Spurzheim,' say the Reporters, 'dissected the brain in our presence, 'and we dissected it before them; and we 'afterwards re-examined, by ourselves, the 'observations they communicated to us.' The results of these examinations are embodied in three conclusions, with which the Committee terminate their Report.* In these conclusions, the anatomical merit of Drs Gall and Spurzheim is made first to consist, 'not in having discovered, but in having re-'called to the attention of Physiologists,' opinions, long since entertained, of the *fibrous* structure of the brain, and of the decussation of certain nervous filaments of the

* See Appendix No. I.

pyramidal eminences:—secondly, in distinguishing *two orders* of fibres, of which, we are told, the hemispheres of the brain 'appear' to be composed:—and, thirdly, in 'making it probable' that the cerebral nerves ascend from the medulla oblongata, rather than descend from the brain; and that, in general, the nerves do not come originally from the brain. This small measure of praise, in which nothing new is stated to be discovered, but only certain facts recalled to attention, and some questionable opinions declared to be more or less probable, disappointed the sanguine expectations of Messrs. Spurzheim and Gall; and drew from them a quarto volume of 274 pages, wholly occupied with a criticism on the decision of the Committee. I am not, however, aware that this laborious effort changed, in any respect, the opinions of the French anatomists; and yet, by many in this country, the alleged discoveries of Gall and Spurzheim have been held to receive general support.

from the investigations of the Anatomists of France.

In 1815, Dr Spurzheim introduced the doctrines of his colleague and himself to the notice of this country, by the publication of a work entitled, 'The Physiognomical System of Drs Gall and Spurzheim, by F. G. Spurzheim, M. D.,' which was prefaced with a short outline of their views of the anatomy of the brain. Still farther to make known his doctrines, Dr Spurzheim delivered Lectures upon them, and exhibited demonstrations of the brain in London and Dublin; and in 1817, he made his appearance in Edinburgh. Soon after his arrival, he expressed to Dr Thomson a wish to exhibit a demonstration of the brain, and was soon furnished with the opportunity, and accommodated with the use of Dr Thomson's theatre for the purpose, where he gave two demonstrations of that organ. Dr Gordon, with a great number of persons, both professional and others, were present. The dissection

was made with considerable dexterity; and the order pursued in it was so different from that usually followed in this country, that it excited much interest, and impressed many with the belief of great discovery in the anatomy of that organ.

It cannot be denied, that, even by professional persons in this country, the anatomy of the brain has been studied only in a very general manner; nor is it difficult to assign a reason for it. It is justly observed by the Committee of the French Institute, that 'none of those, who have examined the brain, have succeeded in establishing a rational and positive relation between the structure of that organ and its functions, even those which are most evidently physical; and the discoveries hitherto made known with respect to it, are confined to some circumstances regarding the form, connexions, and texture of its parts.' Hence the study of this organ has not commonly been carried farther than the acquisition of such a know-

ledge of the relative position and natural appearances of its several parts, as might be useful in the consideration of their morbid changes; and to professional men, therefore, in general, many parts of the demonstrations of Gall and Spurzheim appeared as new as to those without the pale of the profession. Nor does this ignorance of the minute structure of the brain appear to have been peculiar to this country; for Dr Spurzheim himself, after having visited most of the great cities on the Continent, in order to make known his opinions, has taken upon him unequivocally to assert, that, 'till our days, only the *external forms* of the brain were known, and the *internal structure* of its parts was quite overlooked.' * Without going quite so far as Dr Spurzheim on this point, I am ready to admit, that but few were prepared, by previous knowledge, to estimate the real merits of his demonstrations; and consequently many were disposed to re-

* Physiognomical System, Introduction, p. 4.

gard as discovery, all that to them was previously unknown, and to receive as demonstration whatsoever was declared to exist.

Without wishing, in the smallest degree, unduly to exalt Dr Gordon's merit, and still less to depreciate that of his contemporaries, I may venture to express my opinion, that, from particular circumstances, no individual in this country was, at the period alluded to, so well prepared as himself to estimate the real merits of Dr Spurzheim's demonstrations. It has been already stated, that while engaged in drawing up the article on the Anatomy of the Brain for his System, he had been long and laboriously occupied in the study of all the later writers on that organ, from Vieussens and Malpighi, down to Reil and Gall; and the representations given in their works, he had sought to verify by actual examination. * He was thus not on-

* With the exception of the three last papers of Professor Reil on the Structure of the Brain, which did not appear till 1812, Dr Gordon had perused all his Memoirs on

ly informed of what had been done by others, but of the methods they had severally employed. Parts therefore, and appearances, which seemed new to many, were quite familiar to him; and methods of preparation and dissection, commenced by Vieussens, and carried so far by Reil, though, in general, unknown at that time in this country, and apparently to the anatomists of France, had been studied by him with the greatest care,

that subject, and prepared different parts of the brain in the manner described by that author. He did not, however, introduce an account of them into his work, as he was desirous of prosecuting still farther the experiments of Reil, and procuring the papers then only promised, and which he afterwards obtained. While the part of the volume, which relates to the Brain, was in the press, he obtained also the large work on the Brain, by M. M. Gall and Spurzheim. On comparing, however, the plates in that work with the appearances in nature, he found, (as he has expressed in a note, p. 129 of his work on Anatomy), 'that these authors had omitted several important parts altogether; that others were represented indistinctly; and 'that there was scarcely a plate in the series, in which 'there were not considerable inaccuracies.'

and even successfully practised. Thus instructed, he was able at once to distinguish what was announced as new, from what was truly original—to separate mere appearances of structure from actual realities—to check any disposition to pass off assertion for fact—and finally to detect and expose the art and fallacy of mixing, with avowed demonstration, hypothetical notions of structure derived from the fancy alone, and which no dexterity could display and render visible to the experienced eye. The objections made at Dr Spurzheim's Second Demonstration and Description of the Brain, Dr Gordon subsequently extended and embodied in a work entitled 'Observations on the Structure of 'the Brain, comprising an estimate of the 'claims of Drs Gall and Spurzheim to Disco-'very in the Anatomy of that Organ.' Edin. 1817. To this work is added, by way of Appendix, the article 'Sur l'Anatomie du Cer-'veau,' drawn up by M.M. Gall and Spurzheim for the Dictionnaire des Sciences Me-

dicales. It contained, at that time, their latest views on the structure of the brain; and was referred to by Dr Gordon as an authentic record of their opinions.

It would be quite out of place, to enter into any detailed view of all the disputed points in this controversy; a few only of the leading questions can here be briefly discussed. Drs Gall and Spurzheim had set out with observing, that the knowledge of the anatomy of the brain had advanced but slowly, partly on account of the great delicacy of the organ, and the very defective methods of dissection hitherto employed: but, more especially, from the total want of *physiological principles* proper to conduct to a knowledge of the nervous system in general, and of the brain in particular. They therefore claimed the merit of introducing new and more successful methods of dissection, and of being guided always by physiological views in the prosecution of their anatomical investigations. By the combined use of these means, they

professed to have corrected much that was erroneous in the descriptions of their predecessors, and to have added to them much that was new. It was Dr Gordon's object to examine, whether the methods thus announced as new, were truly original;—how far the physiological principles, thus ostentatiously proclaimed, were in themselves just;—and if any, and what were the errors which these anatomists had corrected—and what the new inventions or discoveries they had made.

With respect to alleged *novelty* in the mode of demonstration, these anatomists profess to deviate from their predecessors, by commencing their dissection at the base, and proceeding upward towards the vertex of the brain, contrary to the common practice; but, so far from this method being original, Dr Gordon has shown, that, although of late disused, it was long since sketched by Varolius, detailed afterwards by Vieussens, described distinctly by Malpighi, and again *first* revived and followed out with the greatest mi-

nuteness by Reil, in 1795, and in his subsequent researches.

Farther, instead of cutting the parts with the scalpel, Drs Gall and Spurzheim separate the medullary matter of the brain by *scraping*, or tearing it with the fingers, or handle of the scalpel, the better, it is said, to display its fibrous structure. This operation was also assumed as new; but Dr Gordon has shown it to have been practised more than a century ago by Vieussens, to have been adopted by Morgagni, and subsequently employed both by Mayer and Reil. Hence, therefore, it is quite evident that, neither in the mode of demonstration, nor in the manipulations made use of, can these anatomists lay claim to priority of invention: and even the smaller merit of *reviving* these methods belongs not to them, but to their laborious, modest, and candid countryman Reil. The first results on the anatomy of the brain, in which the methods and manipulations above mentioned were extensively employed by

Reil, were published in Gren's Journal for 1795, thirteen years, says Dr Gordon, before Gall and Spurzheim presented their Memoir (which is their first composition) to the French Institute. *

I have next to notice the *physiological principles*, which are declared to afford such great aid in disclosing the anatomy of the brain. The leading principle of this physiology is, that the cortical or grey matter of the brain, though admitted to be very vascular, is in fact a part 'destitute of apparent organization,' (*sans organisation apparente*). Though thus unorganized, however, it performs, according to this physiology, a very singular office—that of nourishing the organized white substance. 'Nous la considerons, comme la matière nourricière de la substance blanche,' say Drs Spurzheim and Gall; and they affirm, that all the white fibres of the brain originate from this grey matter, which is there-

* Observations on the Structure of the Brain, p. 15-98.

fore denominated the *matrix* of the nervous fibres.

The whole of this statement of the structure and functions of the grey matter, Dr Gordon declares to be not only destitute of the slightest evidence, but at variance with the first principles of physiological science. 'Every vascular part,' he contends, 'is formed by its own vessels; and there is just as little reason for imagining the *white fibres* of the brain to be produced by the *grey matter*, as there would be in supposing that the skin forms the cellular substance which it covers; or that substance the muscles; or the muscles the bones." * Nevertheless, this hy-

* Of this physiological hypothesis, an opinion very similar has been expressed by M. Magendie, in his 'Précis Elementaire de Physiologie,' t. 1. p. 162. 'Dire que la substance grise du cerveau produit la matière blanche, c'est avancer une supposition gratuite, attendu que la matière grise ne produit pas plus la blanche, qu'un muscle ne produit le tendon qui le termine; que le cœur reproduit l'aorte, etc. Sous ce point de vue, le système anatomique de MM. Gall et Spurzheim est essentiellement fautif.'

pothesis, under the abused title of physiological principles, pervades almost all the descriptions of these anatomists, and is the fruitful source of many of their alleged discoveries. On its authority, they assert the presence of grey matter in parts, in which not only none others have ever observed it, but have even declared it to be white; and they announce the production of some fibres, and what they call the 'reinforcement' of others, which have no title to existence but what this hypothesis affords. He, therefore, who may desire to see and believe all that these anatomists profess to describe, must first quicken his eye at the shrine of his fancy; and, for the ordinary display of anatomical demonstration, must consent to receive the gratuitous assumptions of a most clumsy and absurd hypothesis.

One of the leading discoveries which, by the help of these new methods and principles, Drs Gall and Spurzheim profess to have made, is, that the white matter of the brain

has a *fibrous* structure. This fibrous structure they elsewhere declare to be the first and most important of all their discoveries, without which all the others would be imperfect. In reply to the French anatomists, they were, however, obliged to admit, that many others had previously recognised the white substance to be in general fibrous. Driven thus from the ground of priority, they next maintained there was not one who had asserted that it is fibrous under all its forms, and in all its regions; and that even those who, with Sœmmerring and Cuvier, recognise a fibrous structure in many parts of the brain, have not dared to say that it is *everywhere* fibrous. *

* ' La premiere et la plus importante des decouvertes, ' même sous un rapport purement mecanique, celle sans ' laquelle toutes les autres seroient imparfaites, c'est celle ' de la structure constamment fibreuse de la substance ' blanche du cerveau partout où elle se trouve. Depuis ' Vieussens et Leuwenhoek, plusieurs anatomistes ont, il ' est vrai, bien reconnu que cette substance est en général ' fibreuse: cependant nous n'en trouvons pas un seul qui ' soit convaincu qu'elle est fibreuse sous toutes ses formes

But, by an overwhelming series of quotations from their several works, Dr Gordon has shown that Malpighi, Vieussens, Leuwenhoek, Haller, Mayer, Reil, Cuvier, and Portal, had all described the general fibrousness of the brain; and that Vieussens, Haller and Portal, in particular, speak of it as being *everywhere* fibrous. It is plain, therefore, that what these anatomists declare to be the first and most important of their discoveries, has long been familiarly known to others, both of earlier and more recent times; and that thus the new facts which they claim to have discovered, like the new methods which they pretend to have invented, were known and employed long before they could

' et dans toutes ses regions.'—*Recherches sur le Syst. Nerveux en géneral et sur celui du Cerveau en particulier*, p. 115. In their larger work, entitled, ' Anatomie et ' Physiologie du Syst. Nerv.' &c. Vol, i. p. 235, it is said, ' Les auteurs qui, avec Sœmmerring, Cuvier, reconnoissent la structure fibreuse du cerveau dans plusieurs ' de ses parties, n'ont cependant pas osé dire qu'elle est ' partout fibreuse.'—*See Dr Gordon's Obs. on the Brain*, Appendix, p. 188.

have lived to apply their new *physiological* principles to investigate the structure of the brain.

It is a curious fact, however, that whilst the hypothesis of these anatomists is said to have afforded such powerful aid in the alleged discovery of the universal fibrousness of the *white* substance of the brain, it should have failed altogether in disclosing another point of structure in this organ, not less visible in itself, nor less easily rendered obvious—namely, that of the fibrous structure of the *grey* matter of the brain; which matter both Sœmmerring and Reil represent as exhibiting a fibrous appearance when lacerated, either in its recent state, or after induration in alcohol. So far, therefore, the evidence of fibrousness in one case is precisely the same as in the other: and if a fibrous appearance be deemed sufficient proof of the fibrous structure of the white matter, it cannot be deemed insufficient to establish that of the grey matter also.

Having thus established that the fibrous structure of the brain, or rather the appearance which gives rise to that opinion, was known to anatomists long before the days of Gall and Spurzheim, Dr Gordon proceeds next to examine some peculiar notions of these anatomists respecting the alleged origin, termination, and uses of these fibres in composing the great mass of the brain. He remarks, that Malpighi long ago observed, that, if we proceed to describe the fibrous structure of the brain by commencing at the base, in that part called *medulla oblongata*, the whole of the fibres might there be said to originate and ramify in all directions, till they terminate at the vertex in the cortical or grey matter. A similar mode of description was afterwards employed by Reil, who states, that, if we set out from the *medulla oblongata*, all the fibres might be regarded as radiating or diverging from this point to the extremities of the nerves, on the one hand, and to the extremities of the fibres in the

cerebrum and cerebellum, on the other: or, reversing the matter, all these fibres might be considered as converging from their extremities towards the medulla oblongata.

The fibres, thus described by Reil, are, in his view, *one* and the same system, and are named *Diverging* or *Converging*, according to the part from which the description begins, and consequently, according to the direction in which their course may be traced. With Gall and Spurzheim, these fibres form *two* distinct orders or systems, differing essentially from each other, not in direction only, but in origin, in termination, and in use.

We distinguish, say they, in the cerebellum and cerebrum, *two* orders of fibres—the fibres diverging, and the fibres converging. Of these orders, the first, or diverging, is said to originate from the grey or brown matter of the medulla oblongata; and, in reference to the entire brain, may be regarded as consisting of three primitive sets of fibres—one destined to form the cerebellum, and the

two others the cerebrum. The former, or cerebellar set, is said to originate from grey matter in those portions of the medulla oblongata called *corpora restiformia*; and, passing respectively to the right and left hemispheres of the cerebellum, its fibres are continued through the *corpus dentatum*, till they terminate in the laminæ of the cerebellum, which they thus contribute to form. Of the two sets of cerebral fibres, the first is said to arise from the grey substance of the *corpora pyramidalia*, and, passing upward through the annular protuberance and crura cerebri, proceeds to form the convolutions chiefly of the anterior and middle lobes: while the second set, commencing in the grey matter of the *corpora olivaria*, and passing upward, behind the annular protuberance, and through the crura cerebri, are continued through the thalami optici and corpora striata, to form the convolutions of the posterior lobes, and other parts in the direction of the median line. Such are he several sets of *divergent* fibres

which are said to form the greater part of the brain; and, in conformity with this notion, they are named the 'Apparatus of Formation.'

The *converging* system of these anatomists, is, in almost all respects, opposed to that which has been just described. Like the former, however, its fibres are said to originate from *grey* matter: but the place of their origin, their course, termination, and use, are altogether different. Instead of springing from a circumscribed part of the medulla oblongata, they arise, it is said, from the grey matter distributed over the entire surface of the brain; that is, they originate in that portion of those very convolutions in which the divergent fibres were declared to terminate. Commencing thus, by an expanded origin over both hemispheres, their filaments are said to unite as they proceed inward, and, crossing the opposite fibres in their course, they at length reach the median plane, where the fibres of each hemisphere, uniting with

those of its opposite, produce the different parts or commissures by which the two hemispheres are joined. As the fibres of this system, from their alleged origin to their termination, are said continually to *converge*, they have been denominated the *converging* system; and from their supposed termination in the parts which connect the two hemispheres of the brain, they derive the appellation of the 'Apparatus of Junction or Reunion.'

Of these two alleged fibrous systems, Dr Gordon declares the greater part to rest only on hypothetical assumptions, or on descriptions which have no prototype in nature; that the small portion of truth they contain has been long known to anatomists; and that the later investigations of Reil into the fibrous structure of the brain, are not only more minute and elaborate, but their results at variance, in every prrticular, with these conjectural statements. He affirms generally, that the origin of any of the fibres of the

brain from the grey matter of the medulla oblongata, is a mere assumption; that, with regard to the Cerebellum, in particular, no fibres can be traced from the *corpora restiformia* into the *corpora dentata*, as these anatomists assert; that the said corpora dentata are not masses of grey substance, but consist of a small quantity of white matter contained in a brown capsule; and that the alleged formation of the laminæ of the cerebellum, by fibres emerging from the corpora dentata, is altogether destitute of proof. In his public dissections, Dr Spurzheim, it is said, did not attempt to demonstrate this last piece of structure; nor have he and his colleague ever ventured to delineate it in any one of the seven engravings of the cerebellum which accompany their large work on the Brain.

Next, with respect to the *divergent* fibres of the Cerebrum, it is maintained, that the alleged origin of the *first* set from the *grey* matter of the pyramidal bodies, and their augmentation or 'reinforcement' from simi-

lar matter in the annular protuberance, and crura cerebri, are quite hypothetical; for that very little of such grey matter exists in any of those parts: that the superficial eminences, called corpora pyramidalia, cannot be considered equal to the production of so much nervous matter as this description implies; that, instead of augmenting in their passage through the annular protuberance, the fibres of the pyramidal bodies are considerably less at the upper part than in the middle of that protuberance; and that the final distribution of these fibres in the grey matter of the convolutions, is a statement wholly incapable of demonstration.

Proceeding next to the *second* set of divergent fibres, it is maintained, that their alleged origin from the grey matter of the corpora olivaria is altogether inaccurate; for, like the corpora dentata, those bodies consist of a firmly indented capsule of brown matter, containing a nucleus of pure white substance; that though Drs Gall and Spurzheim affirm,

that a strong fasciculus of fibres comes out of these bodies, yet they have nowhere shown at what part these fibres emerge, neither in their plates or public demonstrations; that the alleged union of these fasciculi with others of the medulla oblongata, and their ascent behind the posterior boundary of the annular protuberance, is quite imaginary, and altogether inconsistent with the statement of their passing between the transverse fibres of that body; and that the subsequent progress of these fibres through the thalami optici and corpora striata, receiving reinforcements in their course, and finally terminating in the convolutions of the posterior lobe, is purely hypothetical, and wholly indemonstrable.

Lastly, with reference to the *history* of this particular fibrous structure, it is observed, that the passage of the fibres of the pyramidal bodies through the annular protuberance into the peduncles or *crura cerebri*, was known to, and described by Vieussens, Morgagni, Petit, Vicq d'Azyr and Haller;

and was again more minutely detailed by Reil in 1795; and further, that the connexion between the peduncles and the hemispheres was also known to several of the anatomists above mentioned, and, more lately, was successfully prosecuted by Reil, who, in 1809 and 1812, published the final results of his investigations in two Essays, illustrated by engravings, remarkable for their clearness and accuracy. 'I have compared both these 'papers with nature,' says Dr Gordon, 'and 'am satisfied that Reil has left little for his 'successors, either to correct or to discover, 'in this department of the Anatomy of the 'Brain.

'To these valuable dissertations, however,' continues Dr Gordon,* 'not the least allusion 'is made, either by Dr Gall or his partner, 'in any of their writings. And yet the Essay 'in Gren's Journal for 1795, was published 'thirteen years before these gentlemen pre-'sented their Memoir (which is their first

* Observations on the Brain, p. 98.

'composition) to the the French Institute,
'and five years at least, I presume, before
'they were even heard of as anatomists in
'Europe. Again, Reil's Essay in the Ar-
'chives of Physiology for 1809 (to say no-
'thing of the paper for 1812), which contains
'the most complete description of the Brain-
'Proper, was published a year before the
'the appearance of Drs Gall and Spurzheim's
'*quarto* work in Paris; four years before
'the composition of their Essay for the Dic-
'tionnaire des Sciences Medicales; and six
'years prior to the publication of Dr Spurz-
'heim's separate book on Physiognomy. I
'will not do Reil the injustice to insinuate,
'that Drs Gall and Spurzheim have borrowed
'their views, without acknowledgment, from
'him. Had they adopted the descriptions of
'that accurate inquirer, the present pamphlet
'would have been unnecessary. But it is
'surely not unreasonable to have expected,
'that some reference should have been made
'to the writings of an Anatomist, who has the

'sole merit of having revived the investigation of the fibrous structure of the brain in modern times; and who, by pursuing steadily the only method by which that inquiry can be satisfactorily conducted, has obtained results, at variance, in every particular, with those conjectural statements, which, by writing and by travel, these gentlemen have been labouring for years to establish.' *

* In his 'Observations on the Brain,' Dr Gordon intimated his intention of making the labours of Reil on that organ better known to British anatomists, through the medium of an English translation or abridgment; a design which, it is hoped, some person competently skilled in anatomy, as well as in the German language, may yet be found to execute. In the winter of 1817, in addition to his ordinary demonstration, Dr Gordon gave to his class a full account of the labours of Reil in this department of anatomy, and exhibited the numerous preparations, which, during more than four years of continued attention to this subject, he had made to illustrate and verify the accuracy of Reil's descriptions. At the close of these demonstrations, he delivered a brief summary of that author's labours, which, being but little known to the anatomists of this

But hypothetical and erroneous as the description of the *Divergent* system of fibres has been shown to be, it is affirmed by Dr Gordon, that the account given of what has been denominated the *Convergent* system, far exceeds it in error, and is, in truth, altogether imaginary and false. He maintains that no fibres, answering to their alleged system, can be shown to come out from the *grey* substance of the convolutions of any part of the brain, as these anatomists assert; that such a structure is purely hypothetical, and wholly at variance with the real structure of these parts, as unfolded by the investigations of Reil; that these anatomists themselves admit, that they can follow these two systems as 'distinct and visible fibres,' only in the posterior convolutions of the middle lobes of the cerebrum, where, however, it is said to be just as impossible to demonstrate them, as in any of

country, may perhaps be acceptable to those who take an interest in such pursuits. I shall therefore append it to this Memoir. *

* See Appendix, No. 2.

the other convolutions; and, accordingly, says Dr Gordon, 'when Dr Spurzheim was 'called upon, in his public dissections here, 'to make good those affirmations which con- 'stitute the leading features of his system, 'by tracing any of the divergent fibres into 'the grey substance of the convolutions, and 'distinguishing them from the converging fi- 'laments in the same part; he was under the 'necessity of denying that he had ever affir- 'med any such structure to be demonstrable.' Equally imaginary, Dr Gordon affirms, is the alleged progress of these convergent fibres, from the convolutions towards the inner part of each hemisphere, there to form, by uniting with the fibres of the opposite hemisphere, the various connecting parts, denominated, in this system, Commissures of the brain. 'It thus 'appears,' continues Dr Gordon, 'that, un- 'der the denomination of Diverging and 'Converging fibres, Drs Gall and Spurz- 'heim have described, and described imper- 'fectly or inaccurately, parts of the brain

'long known to anatomists;—that they have 'represented as demonstrable, and even de- 'lineated in their engravings, parts which 'have no existence in this organ; and lastly, 'that they have maintained connexions to 'subsist betwixt all these parts, for which 'there is no foundation in nature.'

Besides giving origin to one set of the divergent fibres, the fibres themselves of the Pyramidal Bodies are represented, by these anatomists, as completely crossing each other immediately after their origin; and this decussation was at first claimed as a discovery. It appears, however, that this complete crossing does not extend to the whole of the pyramidal bodies; but that, in reality, these anatomists have described only that decussation, which, as the French Commissioners remark, was first discovered by Mistichelli in 1709; next by Francis Petit in 1710; and was plainly delineated by Santorini. To this Drs Gall and Spurzheim replied, that although these writers had described this de-

cussation, they had done it with no precision —an assertion which Dr Gordon disproves by quotations from their respective works; and as to the smaller merit, of having recalled the attention of physiologists to this piece of structure, Dr Gordon shows that it never has been overlooked, but, on the contrary, has been regularly noticed by Winslow, Lieutaud, Haller, Sabatier, Girardi, Vicq d'Azyr and Portal; all of whom mention, and some of them clearly describe it, though others doubt the reality of its existence. 'These 'decussating ridges,' adds Dr Gordon, 'are 'found, by the method of Reil, to be a part 'of a considerable set of fibres, which ac- 'tually cross from one side of the medulla 'oblongata to the other, and the whole of 'which may be distinctly unfolded in the 'coagulated brain, but in no other way.'

There is one other point of structure peculiar, in several respects, to Drs Gall and Spurzheim, to which I shall briefly advert; it relates to the Convolutions of the brain.

According to these anatomists, the convolutions of this organ are formed by the expanded terminations of the divergent fibres, which are covered with grey matter; they consist of two distinct plates or layers, which touch in the median line of each convolution, and, according to them, are slightly agglutinated to each other by a mucous *neurilema*, or very fine cellular tissue. Each convolution, it is added, may be easily separated into two layers; and if this separation extend through the whole convolutions, all their duplicatures will be transformed, it is said, into a kind of membranous expansion, white, smooth, and fibrous beneath, and covered exteriorly with grey substance. Such an expansion is declared to happen in advanced stages of hydrocephalus; and it was such a case, it seems, which first led Drs Gall and Spurzheim to examine the structure of the brain in general, and of the convolutions in particular. This separation of them into two layers, it is alleged, may also be accomplish-

ed very easily by artificial means; that is, by simple pressure with the fingers from below upwards, or by blowing air, or projecting a stream of water upon them in the same direction.

By Dr Gordon this account of the structure of the convolutions is declared to be quite erroneous, and at variance, in almost every particular, with the very accurate and elaborate investigations of Reil. So early as 1795, that anatomist, who was the first to investigate the *fibrous* structure of the convolutions, described their white substance to be laminated, the laminæ to be fibrous, and the fibres all to radiate towards the surface. The cortex or *grey* substance which covers the white matter, he also described to be fibrous, and its fibres to lie in laminæ. In 1807, along with a variety of figures illustrating the fibrous structure of the cerebellum, he exhibited an engraving of one of the convolutions of the cerebrum, and accompanied it with descriptions, stating it to be composed

of medullary plates, and the plates of fibres, like the laminæ of the cerebellum; and that these laminæ cohere the most weakly in the middle. In 1809 and 1812, he published farther investigations into the structure of this part of the brain, and described a stratum of white fibres, lying between the bottoms of the convolutions and the central parts of the brain, and connecting the convolutions to each other. 'Nothing,' says Dr Gordon, 'can be more correct than the 'descriptions given by Reil of the laminated structure and fibrous appearance of the 'convolutions. With regard to the intermediate substance, the dissections which I have 'hitherto made, do not enable me to speak 'with confidence; though I have no doubt, 'from Reil's general accuracy, both as to 'its existence, and the correctness of the representations he has given of it.' *

From what has just been stated, it appears, that the investigations of Reil, regarding the

* Observations, p. 138.

structure of the convolutions, not only preceded in time, but greatly surpass in minuteness and accuracy, those of Spurzheim and Gall. With respect, farther, to the opinion of these anatomists, that the fibres of each convolution do not unite into one fasciculus, like those of the optic or auditory nerves, but form two distinct layers which touch each other in the median line of each convolution, and are slightly agglutinated together by means of a mucous neurilema, Dr Gordon denies both the accuracy of the description, and the existence of any such mucous neurilema. With Reil, he maintains, that the convolutions are composed of many laminæ, and with the French Commissioners he asserts, that the separation of these laminæ in each convolution can be effected as easily on either side of the median line, as in that line itself; and that all the laminæ, which may be so separated, exhibit precisely the same fibrous appearance. He farther contends, that the experiments

of blowing air on the convolutions, or projecting water on them, in the manner proposed by Gall and Spurzheim, and which are said to produce a separation in the median line, and in that only, are quite incorrect; for that, under these operations, the laminæ separate as easily on either side that line as in it,—as was practised, in Dr Spurzheim's presence, both on the recent and prepared brain, during his second demonstration. It follows, therefore, 'that the hypothesis of Drs Gall 'and Spurzheim, that the convolutions of 'the cerebrum or brain-proper are compos-'posed, each of two layers of fibres and no 'more, joined together in the middle by a 'mucous *neurilema*, is not only illogically 'deduced from experiments and observations 'imperfectly or inaccurately made, but is 'directly at variance with facts which are of 'easy demonstration.' *

As the condition of the brain in hydrocephalus is said to have first excited Drs Gall

* Observations, p. 146.

and Spurzheim to a particular examination of the structure of the Convolutions; so, in its turn, the anatomical hypothesis thence derived is brought to explain the state of the brain in that disease, and the manner in which it has been accomplished. The disease called Hydrocephalus, or Dropsy of the Brain, consists, as is well known, in an effusion of fluid into the ventricles of that organ. In their natural state, these cavities contain little or no fluid of any kind; and as, in their healthy condition, they cannot be made to contain more than two or three ounces of liquor, it is obvious, that, when the quantity effused increases, as it sometimes does, to several pounds, the ventricles must be morbidly enlarged to receive it. Sometimes this enlargement of the ventricles is not accompanied with any enlargement of the external dimensions of the brain, but frequently it is, and then the cavity of the cranium is proportionally increased. In the latter case, the convolutions of the cerebrum

are observed to become broader, but less deep; they preserve, however, even when much thinned, their internal solidity. The fossæ between them are as narrow as at first; nor is there any rupture of the vessels of the *pia mater*. The process of enlargement sometimes goes on, until, at length, the form of convolution disappears altogether, and there remains only as a wall to the enlarged ventricles, a stratum of white substance, not thicker perhaps than the eighth part of an inch, with a layer of brown matter superposed. In some instances, the progress of the disease is arrested at this point, and the individual lives many years with the brain in this state: In other instances, the disease proceeds until the thin remaining expansion of white and brown matter, forming the vault and sides of the ventricles, vanishes also.

Previous to the knowledge at present possessed of the functions of the absorbent system, Pathologists very generally considered

this condition of the brain in hydrocephalus to be produced by the distending force of the water progressively effused into the ventricles, of which Dr Gordon has afforded ample proof, by extracts from the Works of Vesalius, Tulpius, Petit, Hunauld, and Morgagni. This doctrine of mechanical distention is revived by Drs Gall and Spurzheim, who profess farther to have discovered the mode in which it is made to act. They maintain, that the brain is in no case disorganized or destroyed, but that the fluid accumulated in the ventricles, by the exertion of a gentle, but constant and regular force, acts on the convolutions till their duplicatures are unfolded and transformed into a kind of membranous expansion, white and smooth within, and covered externally by grey matter. This action on the convolutions is said to commence at the bottom, where each duplicature of them may be easily separated into two layers; and their fibres, which at first were vertical, are then said to assume a horizontal position.

Against this doctrine of simple distention, it is contended by Dr Gordon, *first*, That the brain is unable to bear it without suffering extensive laceration, and yet that no such effect is perceptible either on the ventricles or elsewhere; nor is there any rupture of vessels, either in the substance of the brain or in the *pia mater*; *2dly*, That the ventricles are sometimes enlarged by fluid without any corresponding enlargement of the brain externally; and, in a case that occurred to Reil, where the brain was greatly enlarged from the presence of water in the ventricles, the convolutions were not at all split up or otherwise affected—conditions quite incompatible with the foregoing hypothesis of simple distension; *3dly*, That the blood-vessels cannot, by any conceivable calculation, be imagined capable of exerting a power equal to the effects produced, especially in advanced stages of the disease. As to the assertion, that the two layers of the convolutions are unfolded in the progress of the disease, it is

sufficient to remark, that this is advancing one supposition on another equally groundless, for such a structure has no foundation in fact; or, even granting that it had, there is no force operating from the ventricles, which could effect the separation of the two layers, without producing laceration of the thick stratum of cerebral substance everywhere interposed between the surfaces of those cavities and the bottom of the convolutions; yet such laceration is never remarked in hydrocephalus. That there is no loss of substance in a hydrocephalic brain, in any stage or degree of the disorder, as Gall and Spurzheim assert, is maintained to be a position not only without proof, but demonstrably incorrect. And as to the argument for that opinion, derived from the circumstance, that persons affected with hydrocephalus have often preserved their faculties for many years, Dr Gordon replies, with the Committee of the French Institute, that as we 'do not know with what part of the brain,

'nor with what circumstance of its organi-
'zation these faculties are connected, we can
'draw no conclusion from it relative to the
'essential structure of the brain.'

'The agents,' continues Dr Gordon, 'by
'which these singular changes are accom-
'plished on the cranium and its contents in
'this disease, are imperceptible to our sen-
'ses; but there is only one theory with re-
'spect to them which will explain the phe-
'nomena. They can be no other than the
'secreting and absorbing vessels of the parts
'which are affected:—Those very powers,
'the balanced and reciprocal actions of
'which, in the growth and modelling of the
'healthy machine, have been so well de-
'monstrated by Mr Hunter, and of which,
'the modified operations are more or less
'disclosed in almost every instance of local
'disease:—those agents, for example, which
'preserve to the thigh-bone its peculiar form
'and structure throughout the whole period
'of its growth, while they are the very powers

'by which its growth is accomplished—which 'occasion the disappearance of the alveolar 'arch in old persons, and make way for the 'rising teeth in young ones—which throw 'off a slough from a sore, or an exfoliation 'from a bone—which cause a lung to waste 'without hemorrhage—which enlarge an o- 'vary until it forms a bag as large as the 'abdomen—or thin the substance of a kid- 'ney until it is reduced to a mere mem- 'brane.' *

Beside these more important features, there are some minor points in dispute which an actual reference to dissection can alone ultimately decide.—Such are the questions, whether the medulla oblongata, the crura cerebri, and the thalami optici really possess the large quantity of *grey* matter in their substance which these anatomists affirm—whether, also, as they assert, these thalami have no connexion, by means of fibres, with the optic nerves, or whether the fibrous con-

* Observations, &c. p. 152.

nexion between these bodies and the optic nerves, described first by Vieussens, and subsequently confirmed and extended by Reil, be just;—whether the body called Fornix be composed of fibres derived from the posterior convolutions of the middle lobes, as Gall and Spurzheim contend, or consist of fibres which begin at the extremity of the *pes hippocampi* in each lateral ventricle, and end in the thalami optici, as Reil is said to have shown;—whether, farther, the fibres of the opposite halves of the fornix remain quite distinct, without crossing over the median line, as the same anatomist affirms, or intermingle with each other, so as to form a Commissure, as the system of Gall and Spurzheim requires;—whether the bodies called corpora dentata, and corpora olivaria, consist entirely of *grey* matter, and have the size and figure represented by Spurzheim and Gall, or are much smaller in size, and composed of a nucleus of *white* matter, enclosed in a capsule of brown, as described

and delienated by Dr Gordon, and also by Vicq d'Azyr;—whether, again, as these anatomists affirm, the annular protuberance contain a very large quantity of grey matter, or only a very small portion of that substance, as others maintain:—And, *lastly*, whether the fact, of grey matter being at all seen in this protuberance, do not depend on the mode in which its section is made: For as Dr Gordon was, we believe, the first to observe, and has delineated in fig. 5th and 6th of his Observations on the Structure of the Brain—'Every particle of the substance 'which appears *grey* when the protuberance 'is divided vertically, may be shown to 'consist of transverse or horizontal fibres, 'coming from the peduncles of the cerebel- 'lum, which uniformly present this dark ap- 'pearance when they are divided directly a- 'cross, although they are as white as the 'whitest nervous substance, when cut in a 'direction parallel to their length. It is on- 'ly when divided in a direction exactly pa- 'rallel to their course, that the fasciculi con-

'tinuous with the pyramidal bodies themselves appear of a white colour: if they 'are cut across, or horizontally, they exhibit 'a grey hue; so that the colour of the different sets of fibres in the annular protube'rance, depends entirely on the section which 'is made of them. In a vertical section of 'this body, the fibres continuous with the 'corpora pyramidalia are white, and those 'connected with the peduncles of the cere'bellum grey. In a horizontal section, it is 'exactly the reverse; the former are grey, 'and the latter white.' *

The foregoing questions, and some others which relate to the minute anatomy of this organ, and respecting which different statements have been given, we willingly leave to the future determination of those who, to the best opportunities, and greatest skill in dissection, bring to the investigation minds free from prejudice, and unshackled by preconceived notions. It is on-

* Obs. on the Brain, p. 77, & Syst. of Hum. Anat. i. p. 140.

ly by means of a most refined and elaborate anatomy that some of them can be truly decided; and supported as the descriptions of Reil are by the actual experience of Dr Gordon, we have little hesitation in anticipating their final triumph over the opinions of Spurzheim and Gall. As to the *hypotheses* of these anatomists, respecting the nature and office of the *grey* matter of the brain, and the doctrine of the origin and reinforcement of fibres thence arising—these are points which any one who chuses may believe, but which anatomy is incompetent to demonstrate; and which, therefore, all sober inquirers will do well to disregard, when studying the facts and appearances which present themselves in investigating the minute structure of the brain.

This very able and learned Essay procured for its author the thanks of several philosophers and anatomists, of whose approbation any man might justly be proud. An eminent anatomist of London tells him, that 'he 'deserves the thanks of all British anato-'mists, for having so completely settled the

'question about these vaunted anatomi-
'cal discoveries;' and the opinion of the illustrious Cuvier, to whom Dr Gordon transmitted a copy of this work, I shall beg to subjoin entire, since it adds at once to the interest of my narrative, and to the honour of my friend's memory.

'MONSIEUR,

'J'ESPÉRAIS vous remercier beau-
'coup plutôt du présent interéssant que vous
'm'avez fait, mais je voulais vous lire aupar-
'avant, et je n'en ai pu trouver le tems que
'depuis peu de jours.

'Il est vrai que MM. Gall et Spurzheim
'ne distinguent pas toujours assez nettement
'dans leurs ouvrages et dans leurs leçons
'ce qui est hypothétique, et ce qui repose
'sur des observations positives; et que leurs
'observations, même quand elles sont ex-
'actes, ne sont pas toujours aussi neuves
'qu'ils le pensaient quand ils les ont faites.
'Leurs figures présentent quelquefois ce qu'ils
'ont cru, plutôt que ce qu'ils ont vu: mais

‘les critiques nombreuses que l'on a faites
‘de leur travail, serviront à le rectifier en lui
‘laissant le mérite, qu'il a en effet, d'avoir
‘appelé l'attention sur des rapports des
‘parties du cerveau, que l'on avait presque
‘négligés avant eux dans l'enseignement.

‘Votre ouvrage, Monsieur, est le plus solide
‘de ceux qui ont été dirigés contre eux:
‘vous faites voir des erreurs matérielles dans
‘leurs planches, des négligences dans leurs
‘descriptions, des oublis dans leurs cita-
‘tions, qui sont incontestables. Je suis fort
‘aise de trouver que vous pensez comme moi
‘sur leur prétendu déplissement du cerveau,
‘qui m'a toujours paru une pure illusion.

‘Veuillez donc recevoir l'expression de
‘ma reconnaissance, et celle de la haute con-
‘sidération avec laquelle je suis,

‘Monsieur,

‘Votre très humble, et

‘très obéissant Serviteur,

‘G. CUVIER.’

‘Au Jardin du Roi, à Paris,
le 31 Août, 1817.

This work drew from Dr Spurzheim a pamphlet designed as a reply, not to Dr Gordon only, but to his other Opponents in Britain. Of this pamphlet Dr Gordon did not think it necessary to take any public notice; but he communicated to his Class his opinion of it in the following terms, which I copy from notes found among his papers. 'Dr Gall's colleague, before his departure 'from this place, published a pamphlet, 'which he wished to be understood as con- 'taining a reply to my Treatise; and if you 'have read the one, I hope you will read 'the other. As an answer to my Treatise, 'I cannot regard it. It seems intended to 'be read only by those who have not perus- 'ed my "Observations." It attributes to 'me opinions respecting both the functions 'and the structure of the brain, which I 'have nowhere expressed, either in my lec- 'tures or books. My objections were di- 'rectly and pointedly urged; and they 'ought to have been as directly replied to;

'but instead of this, the writer studiously 'evades them all. For these reasons, I do 'not regard this pamphlet as any reply to 'my "Observations." I must add, how-'ever,' continues Dr Gordon, 'that this 'pamphlet contains a statement with respect 'to a recent dissection of an hydrocephal-'ous patient in the Royal Infirmary of this 'place, which has been directly contradict-'ed, publicly and privately, to the author 'himself; but which is so calumnious to the 'Institution, and to the Individuals concern-'ed in that dissection, at the same time that 'it is so unfounded, that it does not increase 'the reliance I have been inclined to place on 'averments, as to matters of fact, coming from 'that quarter.'

The statement here referred to occurs in pages 37, 38, and 39 of Dr Spurzheim's pamphlet, and relates to a dissection, made on the 28th December 1816, at which Dr Spurzheim states himself to have been present among the students as a spectator. He asserts, that, after the cranium was removed, the

diseased appearances of the parts within were not exhibited to the spectators. He insinuates, that the dissectors in the area purposely surrounded the body, so that no one could see what was doing except themselves; and that when a gentleman moved sidewards to give him (Dr S.) at least a distant view, Dr Gordon intentionally placed himself in the opening just before him. He adds, 'that he had 'never seen a public dissection made with 'less advantage, and less instruction to the 'pupils:' And while he acquits all others of blame on this occasion, he points to Dr Gordon as alone concerned 'in preventing this 'case from receiving its proper publicity.'

This statement deviates so widely from what was either done or intended on the occasion referred to, that it required no common skill in the art of misrepresentation to contrive it, and still more uncommon hardihood in assertion to set it down for truth. The mistakes—to give them not a harsher name—into which Dr Spurzheim had fallen, were pointed out to him by Mr Joseph

Bell, the Colleague of Dr Gordon in the Infirmary, whose duty it had been to direct the dissection in question. Among Dr Gordon's papers, I find also a 'Statement' of circumstances relative to this dissection, drawn up by himself, and submitted to the senior surgeons of the Royal Infirmary, in refutation of the charges and calumnies against himself and his colleagues, contained in Dr Spurzheim's pamphlet. After stating that the dissection was performed by Mr Joseph Bell with the greatest care, every part of the organ being minutely examined, the whole of it carefully weighed, and the contents of the ventricles exactly measured; that Mr Bell, to gratify the laudable curiosity of the gentlemen attending, actually handed round among them the scull-cap, and portions of the diseased cerebellum; and that, on the following day, a very clear, accurate, and concise Report of the dissection, drawn up by Mr Bell and his clerk, was presented to Dr Duncan senior, the Clinical Professor—Dr Gordon thus proceeds,—'Such being the

'facts relative to this dissection, it was with 'equal indignation and surprise that I read 'the account of it which was soon after in- 'troduced by Dr Spurzheim into a pamphlet 'published by him in this place. In that 'pamphlet, it was affirmed, that the indi- 'viduals performing and assisting in the o- 'peration, intentionally conducted them- 'selves in such a manner as to conceal the 'morbid appearances which presented them- 'selves from the whole of the spectators, 'and, in particular, from the author of the 'pamphlet himself, who states that, on that 'occasion, he had placed himself among 'the students in the Theatre. I feel perfect- 'ly confident, that there is no one who knows 'either Mr Joseph Bell or myself, who will 'for a moment suppose that either of us is 'capable of such conduct as is here attribut- 'ed to us. Nothing can be more false than 'Dr Spurzheim's accusation. The very pre- 'sence of that person among the other spec- 'tators was wholly unknown both to Mr 'Bell and myself; but had it been otherwise,

'I am very certain that no one would suspect that either of us would have been so far regardless of our own dignity, as to permit such a circumstance to influence us in the discharge of our public duty.

'Fully sensible how much the reputation of the Royal Infirmary was involved in the statement of this dissection, presented to the public by Dr Spurzheim, Professor Russel took the earliest opportunity of contradicting it in his Clinical Lectures. Mr Bell also, did not fail to remonstrate with the author of the pamphlet himself on the subject; and having occasion, a short time after, to treat of hydrocephalus in my Lectures, I felt myself called upon, from a regard to the character of the Infirmary and of my colleague, as well as with a view to repel the insinuations thrown out against myself, to pronounce the statement in question, in the most positive manner, to be false.'

To this statement of Dr Gordon, I shall add, with permission, that of Mr Bell him-

self, drawn up, like the former, for the information of the senior surgeons, and addressed to James Law Esq.

'*St Andrew's Square,*

'DEAR SIR, *14th March*, 1817.

'IN compliance with your request, 'and with that of the other surgeons of the 'Royal Infirmary, I subjoin the following 'statement of what took place on the 28th 'of December last, at the dissection of a 'girl who died of hydrocephalus.

'The dissection was conducted in the 'usual manner. No observations were addressed to the students, except when, on 'their showing some marks of dissatisfaction, Dr Gordon requested them to be silent, and said that they should be afterwards 'informed of the particulars. The number 'of individuals in the area amounted probably to twelve or fifteen, and perhaps I was 'not sufficiently careful to prevent the view 'of the students (in the theatre) from being

'obstructed: but I consider it almost un-
'necessary to say, that no intentional ob-
'struction was interposed.

'The scull-cap and a portion of the dis-
'eased cerebellum were handed round for
'the inspection of the students; and if a
'minute examination of any other parts had
'appeared to me likely to afford information,
'I should have directed them to be handed
'round likewise; yet I would not be un-
'derstood as admitting, that this is a prac-
'tice which ought invariably to be follow-
'ed.

'A detailed account of the appearances
'was delivered on the following day, to the
'Clinical Professor; and the Journal being
'open to the students, constitutes, in my o-
'pinion, the legitimate mode in which they
'may satisfy themselves, as to every particu-
'lar of the dissection.

'In a conversation with Dr Spurzheim,
'which I brought on for the purpose of ob-
'taining an explanation, he instantly assured

'me, that the remarks which he had published 'respecting this dissection, had no reference 'to me: and on my informing him, that de- 'monstrations were not usually given, but 'that regular accounts of the dissections 'were inserted in the Journals for the infor- 'mation of the students, he said, that, had 'he been aware of these circumstances, he 'would not have made the observation con- 'tained in the 39th page of his pamphlet;'— "that he (Dr Spurzheim) had never seen a "public dissection made with less advantage "and less instruction to the Pupils."

'JOSEPH BELL.'

With these statements, in themselves so completely satisfactory, I might at once take leave of this part of the subject; but it may be proper I should add, that the hostility displayed in Dr Spurzheim's pamphlet, was probably excited by a *critique* on the works of Gall and Spurzheim, which appeared in the Edinburgh Review, and of which Dr Gordon was generally considered to be the

author. Certainly some expressions in that article might, with propriety, have been spared. As it is not however probable, that the Reviewer had any personal knowledge of the authors, he could not have been actuated by any personal feeling; but must have formed his opinions from the study of their works alone. Now, it is quite evident, from the discussions into which he has entered, that he considered these anatomists to have committed many palpable errors, and to have conducted themselves towards other anatomists with the greatest injustice. It is not surprising therefore, that, in criticising their labours, he should have warmly vindicated preceding writers; and exposed, as far as he was able, the extravagant pretensions and manifold mistakes which he considered them to have made. The assumption of superior merit is always of itself sufficiently offensive; but when coupled with unfounded claims, and disregard or depreciation of the merits of others, it ought not to escape the severest animadversion.

With respect to the Craniological system of these writers, the Reviewer seems to have attached no sort of credit to it; but, on the contrary, to have regarded it, with many others, as not less fanciful and delusive than the Animal Magnetism of Mesmer, or the Metallic Tractors of Perkins,—both of which, for a time, obtained some credit in the world, but have long since been rejected as partaking of deceit and imposture. Whether the Craniology of Gall be destined to undergo a similar fate, or to sink merely like the Physiognomy of Lavater, or survive as a distinct branch of science, experience will one day show. But those who viewed it as false and delusive in its principles, unsound and often puerile in its evidence, and in its mode of propagation not strictly scientific, might naturally be expected to treat it with severity and ridicule. When, too, the authors of such novel opinions thought fit to declare, that 'they were far from thinking that ignorance and knavery would not attack their doctrines with abuse,' it does not appear

to me, either that their good opinion of themselves, or their ill opinion of others, entitled them to extraordinary indulgence. And therefore, when a critic, in the examination of their doctrines, saw sufficient cause to question their knowledge and sincerity, he was surely at full liberty to retaliate, by throwing back on themselves the imputations they would fix upon others.

The last anatomical work which Dr Gordon communicated to the public, was a Fasciculus of Plates in octavo, exhibiting a series of representations of those parts of the Human Skeleton, with which it is of most importance for the physiologist and the medical practitioner to be accurately acquainted. On the publication of the first volume of his System of Anatomy, he had expressed his regret in not having been then able to accompany it with a series of engravings, on account chiefly of the great delay and expense necessarily attendant on such a plan.

It was an object, however, which he bore constantly in mind; and the present work was the first step to its performance. It consists partly of designs selected from the works of the most esteemed anatomists, but chiefly of those taken from dissections and preparations made by the author himself.

There is not much room for novelty in a work of this kind, the chief merit of which must consist in selection of objects, in accuracy of representation, and perspicuity of description. These properties it possesses in a high degree; and the delineations of the organ of Hearing in particular, may lay claim to superior correctness. From the great complexity and minuteness of its parts, this is the most difficult of all the organs clearly to apprehend; and the great hardness of the boney case in which it is contained, renders its dissection and preparation a work of great labour and skill. In general, views of the skeleton of the Ear have been taken from the fœtus or child; in these plates they are taken from the adult; and all the parts

are represented of their natural size, and in their just relative position. Outline views, with descriptive references, accompany the engravings in this work; and Messrs Lizars and Miller, the artists employed, have very ably executed their portion of the task.

It was the intention of the author to have illustrated the other parts of the human body in a similar manner, and on the same principle of selection; and there can be little doubt that the work would have been favourably received by the public. It must, however, be confessed, that, from anatomy being studied with us as an useful art, rather than cultivated as a liberal science, the encouragement given by us to works of this nature is not great. One cannot help indeed feeling astonishment, that, while the nations on the Continent, particularly Germany and Italy, are continually producing new systematic works of this kind, of the most elaborate and expensive description; nothing is attempted in this country that will

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bear the smallest comparison with them ; and yet the persons interested in such works are not less numerous, and certainly far more opulent with us, than the same classes on the Continent. But we are so busied with the daily applications of the science, that we lose all relish for the abstract contemplation of it : and anatomy, therefore, is studied with us only for the profit it will yield, and not for the fame it may bring. Had Dr Gordon lived, he might have contributed to wipe away this reproach ; and as our Systematic Writers in Chemistry have not only supplanted foreigners at home, but even spread their works through those countries from which the importations had been made, so, in Anatomy, might similar results be anticipated, were the genius of the country properly called forth to the enterprise. It is an honourable testimony to this opinion, that the work now under consideration, shortly after its publication, was translated into German by Professor Rosenmüller of Hallé, an anatomist of the first dis-

tinction in that country, himself the author of a splendid work on Surgical Anatomy.

That a similar opinion of its merits was entertained at home, I am happy to witness, from a letter I find addressed to the author by a Physician, once enjoying the highest reputation as a Teacher of Anatomy, and now, by the united suffrage of his brethren and the public, elevated to the head of that profession which he dignifies and adorns. 'I 'return you my best thanks,' says Dr Baillie, 'for your Engravings of the Human 'Skeleton, which you have been so good as 'to send me. The Engravings are extremely well executed, the various sections well 'imagined, and the short descriptions pos'sess all that precision for which you are dis'tinguished. The work, when it is finished, 'will be very useful to the public, and credit'able to yourself.'

It has been already stated that Dr Gordon, from the time he began to lecture, taught Anatomy and Physiology in conjunction; and this he continued to do till the summer of 1813. By experience, however, he became convinced that this plan could not be pursued with advantage to either of the sciences which it professed to teach;—that the simplicity and precision of anatomical demonstration, which is addressed directly to the eye, were embarrassed and overlaid by the introduction of physiological reasoning, the principles of which must often be sought in other sciences, and addressed to other senses. In the jejune and dogmatic way in which physiology is frequently taught, this method may continue to be followed; but he who can estimate fairly the importance of that science, who contemplates the vast ac-

cumulation of materials that belong to it, the aid which it seeks from almost every other science, and the doubts and difficulties with which it is every where environed, must admit that nothing worthy of the name of Physiology can be taught as a mere appendage to an anatomical course. Occasional remarks, indeed, on the healthy functions or morbid actions of parts, or on the operations to which they may be subjected, may sometimes be advantageously blended with anatomical description; but to suppose that, in this way, a competent knowledge of physiology, pathology, or surgery can be obtained, would be altogether absurd. The accumulation of knowledge has rendered necessary the separation of many departments of science, as branches of instruction, which were once advantageously conjoined; and this is especially true of physiology and surgery, both of which, however, continue frequently to be taught as parts of an anatomical course. To say that, because these sciences

depend immediately on anatomy, they should therefore be taught together, is an assertion suited only to the state of their infancy, and which has neither reason nor analogy in its support. No one pretends that the several subjects of Natural Philosophy can be profitably taught with the Elements of Mathematics: yet the movements of inert matter seek illustration and proof as directly from mathematical principles, as the functions of Living Bodies do from Organic Structure. Although, therefore, these dependent sciences can never be properly dissociated, yet, in the order of instruction, the simple demonstrations of the one ought to precede the facts and reasonings of the other.

In most of the Universities of Europe, accordingly, in which Medicine is scientifically taught, both Surgery and Physiology have been separated from Anatomy, and treated as distinct sciences. In this University, no provision was originally made to teach Surgery as a science; and it was not

till about the year 1777, that the Professor of Anatomy obtained an extension of his commision to teach surgery also; since which time the two sciences have been nominally taught together. With regard to Physiology, a different rule obtains: for the class in this University denominated 'Institutions of 'Medicine,' comprises, in its proper acceptation, a full history of the animal functions in health and disease; and affords, therefore, an example of the propriety and advantage of teaching the functions distinct from demonstrations of the structure of organs. In some of the Establishments for medical instruction in London, a similar separation has long since been made; and the author remembers, with gratitude, the information he formerly derived from the highly interesting and instructive physiological Lectures of Dr Haighton. The success also which, in Edinburgh, attended the efforts of Mr Allen, whose admirable Lectures on Physiology excited greater interest among the me-

dical students of this school, than any given at that period, either within or without the walls of the University, exemplifies the same truth. Influenced by such considerations, and encouraged by such examples, Dr Gordon announced his intention of giving, during the summer of 1813, a separate course of Lectures on Physiology, which had now become his favourite study, and to which he devoted himself with great ardour. Combining, afterwards, pathological facts with his physiological views, he named these Lectures 'Institutions of Medicine;' and of the eight courses which he subsequently delivered, generally in the winter season, and occasionally in summer, each surpassed that which preceded it in interest, and in the reputation which it brought to its author.

Perhaps there is no science in which so many absurd hypotheses have been framed, nor in which such vague terms and ambiguous reasonings have been employed, as in Physiology. This arises partly from difficulties inherent in the subject; partly from

the intimate connexion it has with so many other sciences; and more than all, perhaps, from false methods of study, and neglect or ignorance of the true mode of inductive investigation.

Among the inherent difficulties may be mentioned our total ignorance of the minute anatomy of every texture and organ, when we approach the mechanism of its ultimate structure. Of the nature of the living properties of these textures and organs, and of the modes in which they exercise their peculiar functions, we are equally ignorant. We see, indeed, certain stages of these functions, and observe many of their products; but the progressive changes which fill up the interval between what we actually see, and the ultimate result, are very imperfectly known. We see, for example, that the body is moved by muscles, and also that the blood is propelled through the vessels by muscular agency; but the actual structure of the muscular fibre itself, the nature of the power or influence

which acts upon it, and the mode of action, are still subjects of doubt and dispute. To the healthy constitution of the blood, the continued access of fresh air is also known to be necessary, and some of the effects which ensue have been ascertained; but many others are still concealed from our view, and the mode in which any of them are produced has not yet been fully disclosed. If we follow the same fluid to the different parts of the body, and contemplate the wonderful and diversified changes produced in it by the action of the secretory organs, the interval between what we know and what remains to be discovered is still farther augmented; and should we next proceed to connect, in the way of physiological explanation, the phenomena of sensation with those of perception and thought, we are soon compelled to retreat in absolute despair. That hypotheses have been framed to remove all these difficulties, is most certain; and the confidence expressed in them has been generally proportioned to the force

of imagination, or degree of ignorance in those by whom they have been proposed;—of imagination, which fills up with its own creations the intervals yet unoccupied by the perceptions of sense,—or of ignorance, uninformed of the facts essential to a right judgement, or perverting and misapplying those which are actually known.

Nevertheless, in physiology, a great number of curious and important facts have been ascertained, which, in some instances, have led to the establishment of certain general laws or theories, of great interest in their practical applications. To the accumulation of these facts and theories, the anatomist, the natural philosopher, and the chemist, have more especially contributed; but each, in turn, by an undue and exclusive application of his peculiar science, has sometimes helped to retard the object which he aimed to promote. Essential as a knowledge of Anatomy, both Human and Comparative, is to the advancement of Physiology, it is far

from being all-sufficient; and great as have been the aids which it has rendered, it has also, on many occasions, by imperfect observation and forced analogies, contributed to the spread of error. To the knowledge of vision, of muscular motion, and some other functions, the science of Natural Philosophy has afforded important aid: but when it attempted to explain all the diversified movements of the living system on mechanical principles, and reduce them to actual calculation, it completely failed. In earlier and more recent times, Chemistry also has lent the greatest assistance to Physiology; and many functions of the system can receive illustration only by the aid of that science. This necessary aid which it renders, has however led, in many instances, to its hasty and extravagant application; and, as might be expected, the chemical processes, least understood in themselves, have been those employed with the greatest confidence in the explanation of the animal functions.

Beside these theorists who, at least, set out from something in the shape of fact, physiology has been incumbered with hypotheses resting scarcely on any facts at all, but springing almost entirely from the loosest analogies, or the vainest and wildest conjectures. To conceal the weakness of such hypotheses, new terms and arbitrary definitions have been invented, imaginary principles assumed, and conclusions reached in words which have had little or no connexion with facts. Not content with observing the phenomena which living bodies exhibit, with tracing out their connexions, and reducing them to general laws, these speculatists have imagined the existence of certain properties, which, assuming gradually the appellation of principles, have at length been regarded as real entities, and designated by particular names. To these Entities, particular seats or habitations have been assigned, from whence they have been made to rule the Animal microcosm with as great authority, and as little regard to its na-

ture and its wants, as Rulers, in general, are accustomed to observe.

It is sufficiently obvious from these few examples, how loose have been the methods in which physiology has been commonly studied, and how necessary a severer mode is to its successful cultivation. It is equally obvious, that, to make any considerable progress in this science, a wide range of knowledge is required, together with an ardour for information which seeks aid and illustration on every side, and a force of judgment which shall so justly appreciate the acquisitions made as to keep every thing within its appropriate limits. In the present state of physiology, many of its alleged facts may be received as sufficiently certain; but many also must be regarded with great doubt and suspicion. These last have been derived partly from imperfect observation or experiment, and partly from false analogies, and the propensity, to which many are prone, of mixing the notions they form of phenomena with what they actually

observe, and thus giving the semblance of fact to what, in reality, is mere matter of opinion.

These and similar reflections on the present state of physiology, and on the difficulties which its study presents, frequently occupied the thoughts of Dr Gordon, who, by the original constitution of his mind, not less than by his acquired knowledge, was well fitted to contend with them. He was endowed by nature with a strong and penetrating judgment, and carried into all his researches such a love of exactitude and order, as necessarily begat a severe scrutiny of facts, and led to a methodical arrangement of them. To unwearied industry of research, he joined an entire freedom from prejudice, and an ardour in the pursuit of truth, which sought information on every side, and but little disposed him to take, on the authority of others, whatsoever he could examine for himself. Well disciplined in the rules of evidence, and the mode of philosophic induction, he was qualified to examine the authority of reput-

ed facts, to detect their errors and deficiencies, and finally to give judgment on the legitimacy of the inferences deduced from them.

Although Human Anatomy had necessarily occupied the greater part of the time he employed in actual dissection, he had also studied deeply the structure of other animals—convinced that the knowledge, which such extended comparisons afford, serves often to relieve physiology from many perplexing difficulties, and to open and clear the way to its most important truths. Of his skill in Morbid anatomy, I have already spoken. No one pursued it with greater zeal, nor estimated more highly its importance in illustrating, not only the diseased actions, but the healthy functions, of the system. In truth, these actions and functions are but two extreme terms of one and the same series; and if a knowledge of the healthy function best qualify us to estimate the amount and predict the consequences of its deviations, so does correct observation of

those deviations, and of the changes in which they terminate, serve not only to verify the accuracy, but promote the extension, of our physiological knowledge.

With these qualifications as an Anatomist, Dr Gordon combined a competent knowledge of the several branches of Natural and Physical science that could in any way aid his pursuits; and this he applied always with the greatest discrimination and success. He was well aware that Physiology is, at present, the most imperfect, because the most dependent, of all the sciences; that, holding relations, more or less intimate, with most of the phenomena of nature, and seeking aid and illustration from all other sciences, it must, in many instances, await their gradual progress and development, before it is itself enabled permanently to advance: and therefore, that his success will ultimately be the most complete, who, to exact observation of individual facts, joins extent and comprehension of view, and, not limiting his attention solely to his own more immedi-

ate province, ranges at large through the world of science, and collects, from every region, whatsoever can embellish and enrich his own.

In discoursing on any function, Dr Gordon was accustomed to state the facts which had been ascertained, in the simplest terms and the most natural order: and when the inferences which arose coalesced into a series of propositions, and assumed the form of a theory or general law, it was exhibited in the plainest language, and with such reservations, doubts and exceptions, as the state of our knowledge, or his own reflections, might suggest. Though always desirous of proceeding by the method of induction, yet, where that was impracticable, he did not wish to banish all hypothetical views from physiological investigation. He knew well, that a collection of mere facts, howsoever complete, possesses, comparatively, little interest or value, unless an attempt be made to arrange and connect them by the exercise of our reason-

ing powers: that, in the present auspicious period, when the human mind is so little disposed to yield to any authority save the convictions of its own reason, hypotheses produce few of the evils which they formerly engendered; and that, professing to rest, as they must now do, on facts derived from observation and experiment, they cannot maintain their ground when better experiments and observations shall conduct to juster views. Till this shall happen, they facilitate the apprehension and remembrance of facts; give to them an interest which they could not otherwise command; and, by exciting attempts either to verify or disprove them, suggest often new researches, by which new truths are disclosed, and the boundaries of science enlarged. Hypotheses such as these Dr Gordon did not refuse to entertain; but he discarded from his Lectures all those fanciful speculations, resting not upon facts, nor even on rational analogies, but on a set of undefined and indefinable terms, invented to conceal

ignorance and protect error, and therefore 'contributing so much more to extend the 'surface, than to increase the solidity of 'science.'

In his 'Outlines of Lectures on Human Physiology,' published only a few months before his death, he has left us an ample sketch of the plan which he adopted, and the materials he employed in its execution. These Outlines present a full Tabular view of the science, and exhibit the arrangement which, for many years, he had been accustomed to follow. The merits of this view, and of the arrangement followed, will, perhaps, be best estimated by a very concise notice of the subjects discussed, and in the order pursued by the author.

Dr Gordon commenced his Lectures with some general remarks on the proper province of Physiology, on its present state, the nature of the facts which it comprehends, and on the theories which prevail in it. He

then noticed its interest as a branch of general knowledge, and its particular importance to the Medical Practitioner: mentioned the previous knowledge required in a Student of Physiology, particularly with regard to Anatomy, Natural Philosophy, and Chemistry; and stated the order in which its phenomena ought to be studied. He proceeded afterwards to arrange the whole subject under *four* principal divisions:—the *first* treating of the Functions, in general, of the Common Systems and Common Textures of the Body: the *second* of the Functions, in general, of the Skeleton, and of Attitude and Progression: the *third* of Vision, Hearing and Respiration, and of the Alimentary, Urinary, and Generative functions: and the *fourth*, of the signs of Life and Death, the Phenomena of Natural decay, and the rate of Mortality among Mankind. A distinction was then made between Elementary and Full views of Physiology; the former being those which contemplate the functions in that

condition only, which regards a state of Health—the latter embracing also the causes, in general, which modify these functions, and produce deviations from the healthy state. To this latter view the terms 'Institutions, or Theory of Medicine,' have been applied; and such was the view exhibited by Dr Gordon in these Lectures. The four great divisions above mentioned, were then subdivided into Parts—the Parts into Sections—and the Sections into Articles; under which term all the particulars of the science were successively and minutely detailed.

These Outlines of Physiology will, I believe, be found to exhibit a fuller and more philosophical view of the science than has ever before been published in this country. The arrangement corresponds, in several respects, with that adopted previously in the author's Anatomical Lectures—commencing with descriptions of the nature and properties of the Common Systems and Textures, and proceeding afterwards to the functions

of particular and more complex Organs. In a course of physiology, there will always be much latitude of choice in the plan of considering the several functions. Some functions, indeed, are so closely associated, either in position or in nature, that they cannot be separated without disadvantage; but others have so many and such varied relations, that the order of treating of them admits of considerable latitude. In whatever part we begin, we commence, as it were, in a circle; for such are the mutual connexion and dependence of the several parts, that a description of the function of any one organ involves a previous knowledge of that of many others. Perhaps the Nervous System, both in structure and in its primary office as the instrument of sensation, may be regarded as, in character, the most distinct; while its necessary agency in the display of living action, and the universality of its influence, seem to point it out as a fit subject for the commencement of the Course. This preference it ac-

cordingly occupied in Dr Gordon's Lectures; and a similar precedence, I observe, is assigned to it in the recent elementary work of M. Magendie.

In entering on the first 'Division' of his Course, Dr Gordon exhibited a general view of the Anatomy of the Nervous System and Muscular Texture, and of their arrangement in the several parts of the body. Proceeding next to treat of the Nervous System in particular, he began with its more obvious phenomena, viz. the impressions we receive from the actual contact of the bodies around us; or those of which we become conscious without visible contact. These impressions are denominated *sensations*, and the parts which are susceptible of them are said to be *sensible*, or to possess the property of *sensibility*. All sensations were referred to two great classes —Simple sensations, as those of Light, Heat, &c.—and sensations of Emotion, as those of Love and Joy. The varieties of each class were farther distributed into *genera*, and

these *genera* again into *species*. It was then observed that some sensations were experienced in one part of the body only, as those of Light and Sound: others in more than one, as those of Touch, and of Heat and Cold; and others again still more universally, as those of Pain. Certain *qualities*, as those of Intensity, Strength or Degree, are common, it was said, to all sensations: others, as those of Position, Magnitude and Dimension, belong to many genera: but those of Tone, Colour, &c. are peculiar to a few. With respect to the *causes* of sensation, they may be divided into Proximate and Remote—the former consisting in some unknown change in the *immaterial* mind—the latter being the series of changes which precede the affection of the mind, and are necessary to it.

The nature, qualities, and causes of sensation having thus been stated, and the property of sensibility considered, Dr Gordon proceeded to offer some remarks on the *differences* in this property dependent on sex

and age; described the effects resulting from the direct application of various substances in *modifying* the sensibility of parts; and detailed also, at great length, the modifications produced by habit, by change of temperature, or by change of condition in the sensitive organs themselves. He next described the modifications in sensibility, arising from causes which operate directly on the Nerve itself, or on the Brain and Spinal Cord, in the various conditions of accident and disease to which they are exposed. To this, succeeded remarks on the modifications of sensibility, produced in distant parts by the reception of different substances into the Stomach, the Lungs, and Intestines; and on the effects which follow the direct application of such substances to the Skin, or to wounded surfaces; with inquiries whether they operate through the medium of the Nervous or Vascular systems? Lastly, The operation of certain trains of ideas, or of sensations and ideas, during emotion, in modifying sensibility, was illustrated by the effects of certain depress-

ing passions, by the deceptions of Animal Magnetism, and by other causes which act on the sensitive organs through the medium of the Imagination.

From the agency of sensations on the Corporeal part of our frame, Dr Gordon proceeded to offer a few remarks on those which more immediately affect the Mind, exciting in us what we call an Idea or Thought. The phenomenon called an Idea was first illustrated; and the questions, whether we are capable of experiencing a sensation and an idea at one and the same moment, or more than one idea at a time, were next discussed. He considered afterwards the *causes*, proximate and remote, of our ideas; described their excitation and sequence; and illustrated the principle of the Association of ideas, and that of Resemblance and Analogy. He then stated reasons for believing that every idea is preceded by some Corporeal change, and mentioned the hypotheses that have been suggested to explain the *seat* of this change, which

some physiologists have placed in the extremities of the nerves, and others in the brain.

Dr Gordon proceeded next to notice the *differences* in ideas dependent on sex and age, and also those *original* differences which are exhibited in different individuals. These latter were referred to two classes; those which arise from differences in the influence of the principle of Association on the train of thought, occasioning the several varieties of Memory; and those which result from the varying influence of the principle of Resemblance or Analogy: After which, the *causes* of these original differences were inquired into. In the same individual also, at different times, the ideas, or trains of thought are variously modified and changed, as occurs in Mental derangement; and in various Morbid states of the brain under different circumstances of accident and disease. *Lastly*, The train of ideas is modified, by the action of various substances received into the stomach or lungs,

or applied to the skin;—of all which, numerous illustrations were given. In a variety of diseases also, the train of thought experiences numerous modifications.

The property of living animals most nearly allied to sensibility, is that of *irritability*, possessed more especially by the organs termed Muscles: but whether by muscle only, is uncertain. Irritability is that property of shortening, which the muscular fibre exhibits when acted upon by an appropriate stimulus. As long as this tendency to shorten exists, the muscle is said to be in action, and as soon as it has ceased, it is said to be in a state of relaxation; but the state of action may exist without shortening of the fibre. In the contraction which so commonly accompanies muscular action, it has been supposed, that the fibres of the muscle were thrown into *rugæ* or plaits; but by observations and experiments on the Human body, and on the Lower animals, Dr Gordon disproved this opinion; and he farther ascer-

tained, that, during action, the thickness of the muscular fibre was not increased.

He then considered at large other phenomena attending Muscular action, as the bulk and hardness of muscle, and the force and extent of its action. The *proximate* cause of action in a muscle, he held to consist in a temporary increased attraction between the particles of the fibre: and the *remote* causes were pronounced to be Stimuli of various kinds. Some of these stimuli operate primarily on the nerves, the spinal cord, or the brain: others act by means of Volition, or the Will. Again, some are named Sympathetic Stimuli; others, Stimuli of Emotion. Next followed observations on various stimuli, both chemical and mechanical, applied directly to muscle, with inquiries whether they act mediately by the nerves of the fibres, or immediately on the fibres themselves; including remarks on the *vis insita* and *vis nervea* of Haller, and on the opinions of Whytt.

The Muscular actions naturally going on in the body, are divisible into Voluntary and

Involuntary. The Voluntary actions are immediately called forth by motives which determine the Will: the Involuntary are divisible into three orders, viz. Sympathetic Actions—Actions of Emotion—and those which excite the motions of the Heart, Intestines, &c. The uses of muscular actions in the living body were then described, as fitted either to produce or prevent motion of the solid and fluid parts, according to circumstances; and the various modes in which the muscles are exerted, for these purposes, in the several members and organs of the body, were enumerated:—comprehending a general view of Muscular Motion, and of the functions which fall more immediately under the dominion of Muscular agency.

After thus stating the more general phenomena of Irritability and Muscular action, Dr Gordon proceeded to consider those *differences* which they present under the varying conditions of sex and age: and those also which occur in different individuals, or are

exhibited, in the same individual, at different times.

Under this latter head, the phenomena of Paralysis, Convulsion, &c. were noticed; and the effect of practice over voluntary actions, both as it affects the rapidity or force of movement, was discussed. The several *causes* which may modify voluntary actions, by operating directly on the muscle, or on the nerve leading to it, or on the brain or spinal cord, were next enumerated; as were those also which produce similar effects, when applied to various natural or wounded surfaces of the body. Lastly, The modification of voluntary action produced by trains of ideas, or of sensations and ideas occurring during emotion, and those also which arise in the different orders of involuntary actions, were exemplified. Some observations on the sensibility and nourishment of muscle were then made; and these were followed by a few remarks on certain other alleged properties of muscle, as those of Elasticity, Tone, and Con-

tractility, which concluded the subject of Irritability, as developed in the various actions and movements of the muscular texture.

To the subject of Irritability succeeded a few general remarks on the Nature of Emotions, and the phenomena which constitute and characterize them; on the differences in emotion among different individuals, and in the same individual at different times; and on those differences also which depend on age and sex.

By the natural exertion of the *voluntary* muscular powers, fatigue sooner or later comes on, emotions cease to be excited, and the system sinks into that state of repose termed *Sleep*. The state of the system during sleep, the phenomena denoting its approach, commencement, and termination; and its duration and causes, were next investigated. The differences in sleep dependent on age, and the various states and conditions of imperfect or interrupted sleep, were detailed; and an enumeration was made of the things or causes, whether natural or ar-

tificial, which favour or prevent the approach and continuance of sleep.

Over all the functions hitherto described, the Brain and Spinal Cord exert a direct and immediate influence, and therefore a few observations on the physiology of those organs formed an appropriate termination of this portion of the Course. These observations commenced with a description of the advantages resulting from the actual construction of the Cranium, as adapted to protect the brain; followed by observations on the admirable combination of strength and mobility displayed in the Vertebral Column, and on the protection which, at the same time, it affords to the spinal cord. The sensibility, nourishment, and uses of the *Dura Mater*, were next discussed; and then followed a description of the functions of the *Pia Mater* and Arachnoid Membrane, with observations on the nourishment and secretions of all these parts, and of the brain itself, the spinal cord, and the nerves.

Having thus delivered the functions of

the Nervous System and Muscular Texture, Dr Gordon next proceeded to describe the functions, in general, of the Circulating System. With this view, he described the Circulation of the Blood as discovered by Harvey;—traced the course of that fluid through the heart in particular, detailing the peculiarities of structure, and the various actions of that organ;—then followed it successively through the arteries and veins, both of the System in general and of the Lungs; and estimated the number of the heart's actions in a given time, and the circumstances and conditions which variously modify them, so as to create the several states or varieties of the pulse.

He discoursed next of the *differences* in the circulation of the blood, dependent on sex and age; and on those also which depend either on varieties in the Irritability of the heart itself, or in its natural Stimulus, the blood. Among the causes affecting the *irritability* of the heart, the circulation of

morbid blood through its fibres; affections of the brain, the spinal cord, and the nerves; the application of various substances to the surfaces of the alimentary canal, the lungs, or the skin; sensations of smell, of heat and of cold, of nausea and of pain: trains of ideas, or of sensations and ideas, during emotion: and certain actions, either natural or morbid, were enumerated. It was then stated, that variations in the *stimulant* power of the blood may arise, either from the quantity of that fluid present in the cavities of the heart, or from the force with which it is made to act, or from its composition, independently both of its quantity and force—of all which positions, various illustrations were afforded. Some causes still more doubtful were also mentioned: and lastly, differences in the circulation through the arteries and veins, and in the actions of those vessels, as they modify that of the heart, were briefly discussed.

Passing, in the next place, to a consideration of the Composition and Properties of

the blood, Dr Gordon spoke of the attempts that have been made to estimate its total quantity; delivered the distinguishing characters of arterial and venous blood; and detailed fully their natural and chemical properties. He then described the Coagulation of the blood, and the phenomena which attend it, detailing the effects of various circumstances and agents which influence that curious process.

The *differences* in the Composition of the blood, occurring at different ages, in different individuals, and under different kinds and states of disease, were next enumerated; and the effects produced on the living body, by varying the quantity of blood circulating in it, as in the ordinary operation of Blood-letting, were noticed. The phenomena which follow the Transfusion of blood from one animal into another, and those also which arise from mingling different substances with the blood while circulating in the vessels, were afterwards detailed: And lastly, the alterations produced in the blood by the absorption of

substances from natural or wounded surfaces, and by imperfect respiration, were described.

During its circulation through the system, the blood suffers, in the various organs of the body, those changes termed Secretion, by which new substances are formed different alike from each other, and from their primary source, the blood. The function of secretion is of two kinds;—one affording substances destined to nourish and repair the body, and named therefore *Nutritive* secretion;—the other, yielding products, which, after serving their destined uses, are in great part expelled from the system, and is styled therefore, *Excretive* secretion.

In all Secretions, it was said, the blood seems to pass off from the circulating mass through Capillary arteries, though doubts exist with respect to the Liver. The manner in which the fluid is separated in *Nutritive* secretion, that is, whether by nutrient vessels or lateral pores, was next considered. The varieties of *Excretive* secretion wer ethen arranged under three

classes:—those in which the excreted fluid was poured out through a tube or tubes; those in which it escaped by pores; and those in which its escape, neither by pores nor tubes, could be perceived—under which heads, all the secretions of the body were enumerated and arranged.* The manner in which the blood is conveyed from the capillary arteries in each of these three classes of organs, and the nature and causes of the conversion which it undergoes, were next inquired into. In every instance, the *conversion* was attributed to Chemical change, but of the precise nature of this change, nothing, it was said, is known. A brief view of the hypotheses suggested to explain Secretion, as those of Electricity, Nervous Influence, and a supposed Vital Principle, was exhibited—all of which were considered as unsatisfactory.

The *differences* which arise in the exercise of the Secretory Functions from age, sex, and individual constitution: and the *modifications* produced in them by a state of in-

* See Appendix, No. 3.

flammation; by the action of Stimulant or Sedative Substances on the secreting part; by causes operating on the Nerve leading to the secreting part, or on the Brain and Spinal Cord; and by certain trains of ideas, or of sensations and ideas, were severally considered and illustrated. Next the *modifications* in secretion arising from the application of substances to the Natural Surfaces of the Alimentary Canal, the Skin or the Lungs—comprehending a general inquiry into the action of Medicines, when received into the Stomach or applied to the Skin, and into the effects of vapours and efflùvia, when inhaled into the Lungs, were described: and then followed inquiries into the operation of various Animal, Vegetable, and Mineral poisons, when applied to Wounded Surfaces, and which so modify and change the action of the Secretory Organs, as, in many instances, to create and propagate specific disease.

Although a great part of the fluid, separated in the several processes of *Excretive* secretion, is in various ways discharged from

the system, yet a considerable portion is again taken up, and reconveyed into the blood. The organs supposed to execute this function are small vessels named *Absorbents*, which are distributed on every surface and through every texture of the body. Except those of the intestines, which take up the milky fluid called Chyle, these vessels commonly absorb a Colourless Lymph, the course of which in the vessels, and the powers by which they are supposed to act, Dr Gordon first considered: To this succeeded observations on the composition and properties of the Lymph, both Lacteal and Colourless; and on the sources from which they are derived. These sources are either foreign matter, introduced by the alimentary canal and lungs, and perhaps by the skin; or matter which has already formed the solid parts of the body, or been separated from its fluids by excretive secretion.

Since the time of the illustrious brothers, William and John Hunter, both the milky and colourless lymph have been considered

to be absorbed by appropriate vessels, named respectively Lacteal and Lymphatic Absorbents: but M. Magendie has lately revived the more ancient opinion, that the 'Lacteal lymph alone is taken up by Absorbent 'vessels: that the Vessels, which contain the 'Colourless lymph, possess no absorbent 'power, but originate from the terminations 'of Arteries; that the Colourless lymph is a 'part of the Blood returning to the heart by 'these vessels, instead of the veins: and 'finally, that all the absorptions hitherto 'ascribed to these vessels, are performed by Capillary Veins.'* To these doctrines Dr Gordon made various objections; and it did not appear to him that M. Magendie's objections to Hunter's experiments were valid, or that the new experiments, by which he attempted to reestablish the old doctrine, were satisfactory.

The manner in which the lymph obtains admission into the Lacteal vessels (in which the process is best seen) was then noticed,

* Outlines of Physiology, p. 76.

and it was presumed to be similar in the other absorbent vessels: but whether the mouths of the absorbents have a power of *selection* over the particles of lymph, or these particles enter by Capillary Attraction, was considered as still doubtful. Respecting the changes which the lymph undergoes in its course, and the uses of the Absorbent Glands, little or nothing has been ascertained. This branch of the subject was terminated by a view of the functions of the Absorbent and Circulating systems reciprocally considered. It was shown that the waste of blood, by the various excretions, was continually repaired by the addition of new matter: and that, according to the proportion between the actions of deposition and absorption, there is growth or wasting, or permanency of bulk, in parts.

After exhibiting these views of the Nervous Circulating and Absorbent Systems, which more or less contribute to the construction of the several Textures and Organs, Dr Gordon entered on the functions of some particular Textures, also of very general

distribution. He described first the functions of that *Cellular Substance*, or tissue which connects together the elementary parts or systems: and those also of the *Adipose* tissue, in which the fat is contained. These, by an easy gradation, led to the varied and important functions of the Skin, still but imperfectly understood.

The use of the Skin as an organ of Touch, and the different Sensations, whether pleasureable or painful, which it receives and conveys: the *qualities* of these sensations: their *causes*: and the *judgment* formed from them of the several properties of bodies, were first described. The *differences* in touch dependent on sex and age, or on individual constitution: the *modifications* it experiences from the effects of pressure and temperature; from a state of inflammation; from the operation of certain drugs; from affections of the brain, the spinal cord or nerves; and from the application of substances to the alimentary canal, or the lungs, were next treated of at great length. To these succeeded remarks

on the influence which certain sensations in the Skin exert on the other functions of the body, as those of Heat and Cold on the sensibility in general, on the train of thought, on muscular motion, on sleep, and on the circulation of the blood. Certain *insensible* impressions on the skin were then said to be indicated only by the effects which they produce on the functions of other parts; such are those which result from the application of Tobacco, Opium, Tartrite of Antimony, Mercury &c.

Dr Gordon next proceeded to describe the Excretions from the surface of the skin, wheh er occurring in the form of Sweat, of a peculiar Oily matter, or of a Sebaceous substance. The composition and properties of the sweat, the mode of its secretion, its quantity and uses; the differences in its excretion depending on age, sex, and individual constitution: the various causes which modify its production; and its influence on the other functions of the body, were suc-

cessively detailed. The supposed excretion of Elastic fluids by the skin, was declared not to be established: and doubts were expressed whether any excretion of Carbonaceous matter takes place from this organ. The question, whether or not Absorption goes on from the surface of the skin, was discussed; and the experiments and arguments for and against that opinion reviewed.

Immediately connected with the skin is the Hair which protrudes from it; the qualities, growth, and uses of which, in different parts, were considered and described. Of the remaining Common Textures, Dr Gordon next described the functions of Cartilage, its nourishment and uses; and considered afterwards those of Osseous Substance, or Bone. The formation, nourishment, and uses of bone, the changes it experiences from age, and the modifications which it exhibits, were severally noted: and to this was added a description of the functions and uses of Tendinous Substance. To conclude this account

of the Common Systems and Textures, and, with it, of the *first Division* of the Course, the functions of Serous and Synovial membrane, the properties of the fluids they secrete, and their uses, were detailed.

In entering on the SECOND Division of the Course—embracing a description of the Bones in their living state, and the Movements of which they are susceptible by means of the muscles—Dr Gordon first treated of the Substance of the bones, and of the advantages resulting from their Form in different parts of the Skeleton: next of their Growth, and the changes they undergo after maturity; and then of certain Diseases to which they are subject, and which have greatly contributed to illustrate their structure. He discoursed also of the Marrow of the bones, and its uses; of the substance called Periosteum, which invests the bones; of the Cartilages and Ligaments by which the connexions of the bones with each other are maintained;

and of the motions of the several Joints or Articulations.

Passing then to the various Motions of which the different parts of the skeleton are susceptible, he treated first of those of the Head, and of the muscles which produce them; then of the motions of the Trunk, including remarks on Attitude; and also of of the Trunk as a Pillar of support; next of the motions of the Upper Extremities, with remarks on Prehension; and lastly, of the motions of the Lower Extremities, including Station and Progression—which terminated the subjects of the *second* division.

All the Functions hitherto considered may be deemed *general*, as being respectively applicable to many similar parts of the animal system; but there are several others which are limited to particular seats and organs, the complex nature of which will be more easily apprehended, now that the simpler parts and functions, which conspire to pro-

duce them, have been described. Of these functions, the principal are those of Vision, of Hearing, and of Respiration; the several processes which constitute the Alimentary function; and the Urinary and Generative functions—together with a few others, which, from position and connexion, may be advantageously treated with them.

'Our sight,' says the incomparable Addison, 'is the most perfect, and most de-'lightful of all our senses. It fills the mind 'with the largest variety of ideas, converses 'with its objects at the greatest distance, and 'continues the longest in action without be-'ing tired or satiated with its proper enjoy-'ments.' Although to accomplish its destined use, every part of the body is constructed with the same exquisite skill, yet there is, perhaps, no organ, which, from the variety, the beauty, and delicacy of its parts, the admirable adjustments it displays, and the facility with which its functions can be studied, that has excited so much atten-

tion as the Eye. The knowledge of the properties of Light, disclosed by the Natural Philosopher, has greatly aided the Physiologist in investigating both the structure and functions of this organ; and it may safely be affirmed, that, in few organs of the body, has the minute structure of the parts been so successfuly displayed, and their individual and combined actions so completely made known. To every thing connected with the subject of Vision, whether in Anatomy, Optics, or Metaphysics, Dr. Gordon had paid particular attention, and had sought information from every available source. At the very period of his lamented death, he was engaged with his friend Dr Brewster, in inquiries into the structure and refractive powers of the coats and humours of the Human Eye; and in rendering an account of his labours, the terms in which that distinguished Philosopher has spoken of his late Associate, are such as high worth and talents could alone deserve. ‘ The anatomical structure of the

'crystalline lens,' says Dr Brewster, in concluding his Esssay, 'presented many curious phenomena, which, with the aid and encouragement of Dr Gordon, I was induced to investigate. The premature loss of that distinguished individual put a temporary stop to pursuits, which owed their origin and continuance to his wishes; but though the inquiry was in some degree foreign to my own studies, and by no means inviting to one unaccustomed to anatomical operations, I have resumed and completed it from the same motives which induced me to undertake it. Whatever importance may be attached to it by physiologists, it will always have to me the higher value, of being the only memorial I can leave of a friendship I deeply valued, and the best tribute I can pay to the memory of distinguished talents and exalted worth.'*

Dr Gordon arranged the subject of Vision under two heads, treating first of the func-

* Edin. Phil. Journal, vol. i. p. 45.

tions of the Eyeball; and next of the functions of the Appendages of the Eye. He discoursed first of the *qualities* of the sensations of Light with relation to intensity, colour, direction, &c.; and then inquired into the *causes* of those sensations, tracing them to the effects of Light acting on the Retina of the Eye, but the nature of which action is unknown. He next described the effects produced on the rays of Light in their progress through the transparent parts of the Eye; showed how an inverted image of the Object seen was formed on the Retina; and that distinct vision was owing to a dictinct image of the object being so formed. Adverting then to the advantages resulting from the peculiar structure, form, and position of each individual part of the eye, he proceeded to treat of the Sphere of general and distinct vision, when the eyeball is *fixed*; then of the *motions* of the eyeball, and of the muscles which produce them; and afterwards, of the *adaptation* of the eye for the distinct vision

of objects at different distances. To this succeeded remarks on the secretion, nourishment, &c. of the Humours of the eye, and on the nourishment and sensibility of the Retina. The functions of the Iris, including remarks on the varied colour and movements of the Pupil, together with the functions of the Choroid and Sclerotic coats, were next separately considered; and some observations were then made on the sensibility and nourishment of the Cornea.

Proceeding next to inquire into the *causes* of the different qualities perceptible in sensations of Light, Dr Gordon stated the circumstances on which the intensity or brightness, and the colour or hue of these sensations depend; as well as those circumstances also on which depend the position or direction, and the magnitude and figure of sensations of Light. He treated afterwards of Vision with both eyes, in which it was advanced, that, when an Image of any object is formed on *corresponding* points of the two Retinæ, that object is

seen single; but that, when the image is not so formed, the object is seen double. The judgments which, from sight, we form of the direction, magnitude, figure, distance, and motion of bodies, were next discussed: and proofs adduced that, except perhaps in regard to figure, our judgments of the other qualities are not formed from the visible appearance alone, but on that, combined with a knowledge of other circumstances.

The *differences* that occur in the functions of the Eyeball dependent on age, or on original differences among different individuals, or in the same individual at different times, and the several *modifications* in vision produced thereby, were next enumerated; and the subject was terminated by descriptions of the functions of the Eyelids, the Eyebrows, and the Lachrymal organs.

The next function considered was that of Hearing. The anatomy of the Ear Dr Gordon had studied with peculiar care, as evinced by the beautiful and correct delinea-

tions of it, given in his engravings of the Skeleton, already noticed. Nor had he been less attentive to its physiology, his lectures on this function exhibiting the results of many ingenious and original experiments. He first enumerated the several *qualities* of sensations of sound, and inquired next into the *causes* of those sensations;—then showed that sonorous vibrations were communicated to the *internal* ear, either by the ordinary external passage, or by the solid parts of the head;—and afterwards followed the progress of these vibrations across the tympanum to the Labyrinth, and their propagation from thence to the Auditory Nerve. He next stated experiments, made by himself and others, to prove the communication of similar vibrations to the labyrinth by the solid parts of the head, and showed their application in deciding on the nature of deafness, and in teaching deaf mutes to speak.

In discussing the *causes* of the different qualities perceptible in sensations of sound, Dr

Gordon treated of the Tone or Pitch of Sound; of the Connexion subsisting between the tone of the sensations, and the Number of vibrations performed by a sounding body in a given time;—and next of the Sensation experienced when two or more bodies are made to emit sounds of different tones at the same moment. The circumstances on which the Loudness or Strength of the sensations depends; and the Connexion between the loudness of the sensations, and the Extent described by the vibrations that produce them, in a given time, with many other phenomena regarding the combinations, directions, and properties of sounds, were duly noticed. He proceeded afterwards to the subject of Hearing with two Ears, considered with reference to the number of sounding bodies heard, and to the Loudness and Tones of the sounds: and next inquired into the Judgments formed by the sense of Hearing of the nature of the sounding body, its distance, direction, magnitude and form,

and the conditions by which these are respectively determined, with observations on the nature of that deceptive art known by the name of Ventriloquism.

The *differences* in the functions of the Ear dependent on age; or on original conformation in the nice perception of tone, of loudness, and of other qualities of sound:—the susceptibility of pleasureable emotion from certain successions and combinations of sounds, giving origin to the Musical ear: and the circumstances which affect the strength of sensations of sound, as illustrated in various examples of deafness, concluded the history of this interesting function.

The question next submitted to discussion, was the important subject of Respiration, which comprehended three principal Articles; 1*st*, the Inspiration and Expiration of Air; 2*dly*, the Changes produced in the air during its respiration; and, 3*dly*, the Changes produced by the air on the blood.

Under the head of Inspiration, Dr Gordon first treated of the natural capacity of

the Chest and Lungs; of the causes of their enlargement, and the powers by which it is produced; and of the bulk of air inhaled in an ordinary inspiration, which, by experiments on himself, he estimated at 37 cubic inches, and, by the utmost possible inspiring effort, at 130 cubic inches. Passing then to Expiration, he described the diminution of the cavity of the Chest, the effects of this diminution on the lungs, and the powers by which it is produced. He next stated, that the bulk of air ordinarily expired, equalled exactly that of the air ordinarily inspired: but that, by an extreme expiration after an extreme inspiration, he could expel from his lungs about 260 cubic inches of air. He reckoned about 20 respirations to be made in a minute; and then inquired into the nature of the Stimulus which excites the respiratory muscles to act, both in Inspiration and Expiration.

Having thus described the function of Respiration in its ordinary and more perfect

state, Dr Gordon next treated of the *differences* in its exercise, dependent on sex and age: of those *original* differences observed among different individuals: and also of those differences, which occur in the same individual at different times. Under this latter head, he described the *modifications* in the exercise of this function produced by sleep; by the operation of various emotions: by variations in the quantity or quality of the blood in the lungs: by the effects of strong voluntary actions: by causes operating primarily on the Brain or Spinal Cord: by various agents applied to the Natural or Wounded Surfaces of the body: and by numerous states and conditions of Disease. The bulk of air inspired may also be modified by causes independent of the actions of the respiratory muscles, as by circumstances which affect the Capacity of the lungs themselves, or of the Cavities in which they are lodged.

Proceeding next to consider the changes produced in the *qualities* of the inspired air,

Dr Gordon stated its *temperature* to be increased, and that it loses a part of its Oxygen gas, and gains an exactly equal bulk of Carbonic acid gas, while its Azotic portion is expelled unaltered. With respect to the *manner* in which this change in the chemical composition of the respired air is brought about, he considered the view, which, several years ago, the writer of this Memoir ventured to propose, * as the most probable: viz. 'that Carbonaceous matter is excreted 'into the air cells of the Lungs, by the 'blood-vessels of those organs;—that, in 'these cells, this matter combines directly 'with part of the oxygen of the air respired, 'and forms carbonic acid gas;—that all the 'oxygen which the inspired air loses is em-'ployed in the formation of this acid;—and 'that all the oxygen contained in this acid, 'has been derived from the inspired air.' †

* Inquiries into the Changes induced on Atmospheric Air by the Germinations of Seeds, the Vegetation of Plants, and the Respiration of Animals. Edinburgh, 1807 and 1811.

† Outlines of Physiology, p. 146.

Beside this change in temperature and chemical composition, the air expired is charged with *watery vapour*, the source, quantity and composition of which were described. By various experiments, Dr Gordon ascertained this vapour to be water nearly pure, without any apparent admixture either of Animal or Saline matter. He then noticed the change in its *electrical* state which the air, during its respiration, suffers; and also the facts which suggested the opinion that a part of the air respired suffers, for a time, *condensation* in the Lungs. A description of the variations in the amount of the changes induced on the air, dependent on sex and age, or on differences in individuals, at different times and in different circumstances, was then delivered: and an enumeration of the changes produced, by respiration, on gases differing in composition from atmospheric air, concluded this second branch of the respiratory function.

Treating, in the next place, of the chan-

ges of *colour* produced in the blood, during its transmission through the Lungs, Dr Gordon first noticed the change from Modena to Scarlet, which depends, says he, in the first instance, on the disappearance of oxygen from the air inspired, and the simultaneous formation of an equal bulk of carbonic acid gas: but how this chemical process operates, it is not, he adds, easy to conjecture. To the suppositions that this change of colour in the blood, is to be attributed either to the effect of the Carbonic Acid formed: or to the excretion of Carbonaceous matter; or to any combination of Oxygen with the blood; or to the Caloric set free in the lungs, he stated various objections. Neither do we know more how the opposite change of colour from Scarlet to Modena is brought about, during the circulation through the other parts of the system.

Connected with the Chemical changes that take place between the air and blood in the lungs, is the subject of Animal Temperature, or the means by which, at all times and

in all seasons, the animal body is enabled to preserve nearly an uniform degree of heat. The opinion of Dr Black that Caloric is extricated in the lungs, during the conversion of oxygen gas into carbonic acid, and that the blood thence derives the heat which it afterwards communicates to the system, was first noticed: next the experiments of Crawford on the different *capacities* of Arterial and Venous blood for heat, and also on those of Oxygen and Carbonic acid gases, were referred to; and the objections lately brought against them detailed. It was then stated, that the experiments of the same philosopher, and those of MM. Lavoisier and Laplace, made to ascertain the *comparative* quantities of caloric, extricated in the formation of *equal* quantities of Carbonic acid, by the consumption of oxygen in respiration and combustion, placed this theory of animal heat on grounds quite independent of Crawford's doctrine of capacities; and proved that respiration might be a source of animal temperature, by evidence which

some experiments recently performed, and which seem to affect rather the evolution than source of caloric, were considered not sufficient to invalidate.

Along with the change of Colour which the blood exhibits in the lungs, it seems to undergo, likewise, a change of Composition of the utmost importance to the animal economy, which, for the sake of brevity, and until its nature be better known, may be called its 'Essential change.' The *remote* cause of this change, says Dr Gordon, is the same as that which alters the colour of the blood: the more *immediate* cause is quite unknown.

After this description of the natural and healthy actions that go on in the lungs, Dr Gordon proceeded to state the *variations* that occur in different individuals, and under different circumstances, with regard to the degree of change effected in the colour, temperature, and other properties of the blood. He detailed next the effects produced on the blood by the respiration of various gases differing, in chemical composition,

from atmospheric air; and then made some observations on the sensibility, nourishment, excretions, and absorptions of the lungs.

With the air inhaled, other substances often find admission into the lungs, which, though they produce no *sensible* impression, are yet more or less noxious to Life. Under this head were considered the effects which arise from breathing the air of confined and crowded apartments, or of those in which the combustion of charcoal is going on: also the respiration of certain gases, differing more or less in composition from the air of the atmosphere. The effects likewise, which ensue from impregnations of the air by Vegetable *miasmata* and Contagious *effluvia*, formed a large part of these discussions: and to these succeeded observations on the impregnations of the inspired air by Alcohol, Opium, Tobacco, Lead, Mercury &c. Lastly, an account of the functions of the Pleura, or membrane that lines the Thoracic cavity and of the Trachea, as a part of the Respiratory

organs, was made to terminate the description of the several parts of the respiratory function.

The air, after performing its important office within the lungs, is expelled from those organs through the Trachea or Windpipe, the general structure and functions of which, Dr Gordon briefly described. He next considered the Windpipe as a regulator of the quantity of air inspired and expired. This it accomplishes by changes in the position of the parts forming the Larynx, by which means enlargement or diminution of the Glottis is produced. The occasions on which these changes take place were then noticed; and the muscles which produce them, together with the stimuli that excite them to act, were described. It was added, that various causes, by exciting spasmodic actions in the muscles, vary the diameter of the Glottis; and that certain other causes diminish its diameter, independent of the action of these muscles.

In its escape through the Windpipe, the air contributes to the formation of the Voice, and consequently of Speech, one of the most distinguishing attributes of man. In prosecuting this subject, Dr Gordon first delivered some observations relative to the Number of organs concerned in the production of Voice: and then descanted on the Qualities perceptible in the sounds of the voice, and on their Causes. The *causes* were said to depend on the Glottis, the action of which, according to M. Magendie, is similar to that of a Reed-Instrument. The circumstances on which the *qualities* of the sounds of the voice, as their Tone, Intensity, and Tymbre depend; the various nature of the Stimuli which excite the muscles of the voice to act: and the *modifications* of voice arising from age, sex, and other circumstances, were delivered.

Dr Gordon proceeded next to treat of Speech. Language was considered as a system of sounds, produced by the Vocal Organs and other parts,

and connected, by the principle of previous Association, with certain ideas; and Speech, as the production of these sounds, by these organs. An analysis of the Sounds of which the English Language is composed, was then instituted; and the manner in which they are produced, described. They were divided into two classes, viz. Laryngeal and Oral. Of each individual sound an illustration was given, together with a description of the Configuration of the parts by which it was produced. Next, the combination of these Simple Sounds to form Words, the rules observed in Speech with respect to Tones and Loudness, and Words considered with relation to their meaning, were all separately treated. The subject was terminated, by remarks on the progress of the child, in acquiring the pronunciation of words, and the sort of induction by which it learns to attach meaning to them. *

* The subject of Speech, physiologically considered, was treated at considerable length by Dr Gordon in a very interesting Article, entitled 'Dumb and Deaf,' written

There is yet another function of these parts different altogether in its nature from those just considered, yet in position closely connected

for the Edinburgh Encyclopædia. In this Article, the education of Deaf-mutes is referred to the four following heads, viz. Writing, Manual Speech, Vocal Speech, and the Explanation of the meaning of words. It is under the head Vocal Speech, by means of which, these unfortunate persons may be taught 'both to emit sounds and to articulate them, merely by observing, with the organs of touch and sight, those minute vibrations of the throat, and those rapid and delicate motions of the parts belonging to the mouth, which accompany the speech of others,' that Dr Gordon enters into an enumeration of the various *sounds* which compose speech, and the different *modes* in which these sounds are begun and ended. These sounds he distinguishes into *Laryngeal* and *Oral*; or those which are produced entirely by the Larynx, and those which are only produced by some parts belonging to the Mouth. In the English language, there are *twenty-one* Laryngeal sounds, all differing in *expression* from each other. Of all these, a distinct analysis is made, in which examples of the varieties of sounds, their expression, and the actions of the parts concerned in producing them, are detailed. The *Oral* sounds are only *five* in number. Like the former, they are distinguished from each other by their *expression*; but are said to differ from them in not being susceptible of the slightest variety of

with them; and with respiration, at least, simultaneously performed. It is the sense of Smelling, as exercised by the *inspiration* of air through the nose. In the usual order, Dr Gordon treated first of the *qualities* of sensations of smell, as their Intensity, Odour, Direction, Magnitude, and Form; and then of their *causes*. These sensations are always preceded by the passage through the nose of air of a particular quality, which quality is derived from the addition of certain *effluvia*, emanated from particular bodies, and

tone. Of these also, a similar analysis is given. 'On a 'comparison of the elementary sounds of our language, 'and the modes of beginning and ending them, with the 'written characters by which they are represented, it will 'be seen,' says Dr Gordon, 'that our alphabet is extremely 'imperfect; since there is not a distinct letter for each 'simple sound, and for each mode of beginning and end-'ing; but some sounds and modes are represented by one 'letter, and others by a combination of letters.'—It is this, he adds, 'among other circumstances, that renders a pro-'nouncing dictionary so necessary even to natives, and which 'occasions so much difficulty to the foreigner, and to per-'sons in the situation of the deaf and dumb.'

hence denominated Odours. Reasons were then assigned for believing that the air produces the sensations of smell, by acting on the parts comprehended within the upper *meatus* alone of the nose;—and circumstances were stated by which the qualities of the sensations, with regard to intensity, odour, &c. are varied. An inquiry, how far we are capable of judging of the nature, distance, direction, &c. of odorous bodies by sensations of smell, was then made. The causes which contribute to *modify* sensations of smell, under the different circumstances of sex, age, and individual constitution, and the influence which they sometimes exert on other functions of the body, were next detailed;—and lastly, it was inquired, how far the nose may be considered as an organ of sensations of touch; of heat and of cold; of taste and of pain; and the nourishment, excretions, and absorptions of the Nose were then described.

To support the waste occasioned by the various *excretive* secretions already describ-

ed, and maintain the due growth and stability of the system, new supplies of foreign matter are continually needed. These undergo various successive changes, comprehended under the general denomination of the Alimentary Function. In discoursing on this function, Dr Gordon treated, first of the introduction of solid and fluid substances, as Food, into the mouth; of the sensations of Taste they produce, and of the *qualities* of these sensations, as to intensity, savour, position, &c. He discoursed next of the Extent of Surface over which these sensations are felt, and of their *causes*. These consist in the application of certain bodies called Sapid to the sensible part, and which act generally in a state of partial solution. The various circumstances of age, sex, and individual constitution, which may *modify* sensations of taste, were then enumerated; and the influence of these sensations on the other functions of the body described. The *flavour* of food was stated to depend not on the Taste

of it, but on the Sensation of Smell it occasions. And notice was taken of the sensations of Touch, of Heat and Cold, and of Pain, produced by food in the mouth. Then followed an account of the substances mingled with the food in the mouth, as the Saliva, with a description of its quantity, its chemical composition and properties, of the organs by which it is formed, and the circumstances which modify its excretion.

The food thus mingled with the saliva is submitted to the process of *mastication*, which introduced an account of the Structure and Functions of the Teeth; the uses of each class of teeth; and their successive formation and disappearance at certain periods of life. Connected with the teeth, in this operation, are the Motions of the Lower Jaw, which were next described, as well as certain motions of the Tongue which assist in the process. When duly prepared in the mouth, the food is passed into the Pharynx, by the action of Deglutition, performed by certain powers, which

were then described; and from thence, by the Œsophagus, it is conveyed into the Stomach. The form and structure of this last organ, its capacity, the sensations of which it is susceptible, its secretions, and the chemical changes which they produce on the food, constituting the function of Digestion, were severally discussed; to which succeeded an account of the propulsion of the food into the small intestines; of the powers by which that operation is accomplished; of the stimulus exciting the action of these powers, and the circumstances which modify their actions.

Arrived thus in a digested state in the Intestine, the food there undergoes farther chemical changes, which lead to the formation of the Chyle. The agents employed in effecting these changes are, first, the Bile, the chemical composition and properties of which were detailed, together with an account of its secretion by the Liver, and an inquiry whether it be secreted by the Vena

Portarum or Hepatic artery. Its passage from the liver either into the Intestine, or Gall-bladder, and the causes which modify its quantity or quality, or more or less completely obstruct its flow, were then described; and some remarks made on the derangements of the biliary system thence arising.

Besides the Liver, the Spleen has been supposed to assist in this part of the alimentary function. Its structure was therefore described, and a brief notice taken of the hypotheses advanced in relation to it;—but of its real function, nothing satisfactory was declared to be known. Concerning the Pancreas, we have better information; and the chemical history and properties of its secreted fluid, the mode of its formation, and the quantity and manner in which it flows into the intestine, were described. With these fluids are mixed those furnished by the intestine itself; and an inquiry was then instituted into the manner in which all these agents operate on the food, and the circumstances which modify their action.

In the state of chyle to which the digested aliment is now brought, its nutritive part is taken up by the Lacteal absorbents, and, by the route of the Thoracic duct, is conveyed into the blood. With that fluid it is intimately mixed, and, in its transmission through the lungs, becomes assimilated with it; so that, in its subsequent circulation through the body, it is rendered fit for the purposes of nutrition and repair. The portion of alimentary matter, not convertible into chyle, is passed onward by a peculiar action called *peristaltic*, into the larger intestines—where it undergoes still farther chemical changes, and is finally expelled from the body by the agency of powers, which were next enumerated and described.

Such is the successive series of actions to which the food is subjected in its progress through the alimentary canal. To the continued exercise of these actions, we are excited by the regularly returning sensations of Hunger and Thirst, the nature, causes,

and modifications of which formed the next subjects of consideration. Observations on the various substances that have been, or may be used as food, and their comparative nutrient powers; on the quantity of food necessary to be taken daily, and the periods at which it ought to be taken: on the influence of the Alimentary function on the other functions of the body, when the food is not properly altered in the stomach and intestines, or is not duly expelled from them, were delivered in great detail, accompanied with many practical remarks on the disorders of the digestive function, and on the mode and degree in which they influence the other functions of the system.

By the alimentary function, as we have just seen, the materials destined to nourish the body are converted into chyle, and become mixed with the circulating fluids. Of these fluids, a considerable portion, as we have also seen, is continually employed in forming the various excretive secretions, and

in different ways is rejected from the system; but a part also loses its fluid characters, and, in its office of contributing to the growth and repair of the several organs, acquires gradually the solid state. This state, however, it retains only for a limited period; for, in the same gradual manner, the solids which have been thus formed, are brought to a fluid condition, and, being reassumed into the circulation, are expelled, in turn, from the system.

The organs which contribute most largely to carry off this reabsorbed matter are the Kidneys, the functions of which Dr Gordon proceeded next to consider. He exhibited first a full detail of the chemical composition and properties of the Urine, and described the mode of its secretion, its quantity, and the manner in which it is conveyed from the secreting organ into the receptacle provided for it. The differences which occur in its composition from substances received into the body, either by

the stomach or the lungs; from the influence of certain emotions of the mind, or certain morbid conditions of the body, were next enumerated. After which, the different species of Urinary Calculi were described, the causes of their formation were investigated; and the means of prevention and cure severally discussed. The mode in which the urine is accumulated in the bladder, and its subsequent expulsion, were next delivered; and many modifications connected with sex, with age, and with other circumstances, detailed.

From the urinary function Dr Gordon next passed to the consideration of that destined to ensure the continuance of the race. With this view, he first described the Structure and Functions of the Organs of Reproduction in each sex respectively; next the Condition of the Uterus and its appendages, both before and after Impregnation; then the Development and growth of the newly formed Being, while yet retained in the womb; and lastly,

the phenomena which precede, accompany, and follow its Birth, particularly the Secretion of Milk. He considered afterwards the proportion of still-born to living births;—of males to females; and of twins and triplets to single births,—which concluded the *third* Division of the Course.

Having thus exhibited the physiology of the Human System, and described the several functions as far as the present state of our knowledge will permit: detailing alike those functions common to both sexes, or peculiar to each, Dr Gordon allotted the *fourth* and last division of his Course to the consideration of those Signs of Decay in the organs by which the several functions gradually and successively fail, and the whole of them are at length terminated by death. For a certain period, the powers of secretion and deposition exceed those of excretion and removal; and so long as this occurs, the several organs continue to increase or

grow. When this period is reached, another succeeds, in which these opposite processes seem nearly balanced, and the System, for a time, remains comparatively stationary. But soon the Excretive process begins to predominate, and its effects are manifested by the gradual and successive failure of different functions, not however as yet arresting those essential to vital existence. At length, these also fail, and the system may be said to sink, not so much from the over-action of the *excretive* process, as from the diminished operation of that, by which growth and repair were sustained.

In prosecution of this subject, Dr Gordon treated first of the signs of Life and Death—stating the circulation of the blood as a sign of Life, and the indications of its continuance or cessation in any part of the body:—He then delivered the distinction between Temporary and Permanent Death; and described the decomposition of the body

as a sign of permanent death. The symptoms and progress of natural decay; the period at which it commences and terminates in death; with instances in which it prematurely begins, or is unusually prolonged, were next given. An inquiry into the Causes of decay was then instituted: the necessity of distinguishing decay from the effects of disease was pointed out; and the question, whether or not the progress of decay be susceptible of modification after its commencement, was next discussed.

The Course concluded with a view of the rate of Mortality among mankind, as ascertained by the investigations of Political Economists, and those interested in calculating the contingencies of Human Life:—stating more particularly the rate of general mortality in Great Britain for the whole year, and at different seasons:—the comparative mortality of the two sexes;—and its rate at different periods of life, in Great Britain and other countries.

Such is a rapid sketch of the plan and leading features of the Course of Physiology, which Dr Gordon was accustomed to deliver. In these Lectures, each particular head or position was illustrated and supported by a detail of facts, more or less copious; from which the inferences were made with the utmost caution, and the general truths deduced from an induction as extensive and complete as the state of our knowledge would permit. The facts themselves, were drawn from a most laborious research into writers of all times and countries;—and in the MSS. Notes of Dr Gordon, a distinct reference is made to the author, from whom each individual fact was taken; so that, if brought together, these references would form a *Catalogue Raisonné* of the principal authors who have treated of all the more important points in physiological science. With these selected facts, the results of many original observations and experiments were blended;—and the whole thus formed a body of science on

the subjects discoursed of, which has rarely been equalled either for its extent or precision.

In the Preface to his 'Outlines,' Dr Gordon announced his intention of laying before the Public 'a 'Systematic Work on Physiology,' in which a similar order would have been observed. And certainly, a work that should present, in a moderate compass, what is chiefly valuable in that science, arranged in a luminous order;—combining recent investigation with historical research;—distinguishing every where between fact and opinion, and separating that which may be deemed certain from what is merely probable;—which should give accurate reference to sources of former knowledge, and supply and suggest much that was new;—should yield, on all occasions, due deference to truth, but none to mere name and authority;—unite the greatest freedom of discussion with the utmost respect to persons;—examine alleged facts with the severest scru-

tiny, and judge opinions with the strictest impartiality;—which, in its plan, should be logical and inductive—in its composition, simple and concise;—free alike from trifling details, antiquated hypotheses and idle speculations, but seeking always the generalization of facts and the establishment of legitimate theories;—which, in a word, should exhibit all that was really known, and pretend not to farther knowledge—Such a work in any of the sciences, and most of all in physiology, could not fail to be well received by the public. How far Dr Gordon was qualified to execute the task may be gathered from the works he has left behind him, and the acquirements he has been shown to have possessed. That he did not live to make the attempt is matter of the sincerest regret. His published 'Outlines,' however, of which I have thus briefly sketched the substance, bear ample testimony to the extent of his research, the comprehensiveness of his views, the solidity of his judgment, and the correctness of his taste.

I have now exhibited an account of the Literary labours of Dr Gordon, on which his reputation, as a man of science, must chiefly rest; but it would be unjust to estimate his merits solely by the works which he actually gave to the public. Of these works, only the first volume of the 'System of Anatomy' was published, although the materials for completing the whole were in great part collected, and a considerable portion actually ready for the press. His 'Outlines of 'Physiology,' expanded as they are in his Manuscript Lectures, show also that the materials for the Systematic Work which he meditated on that science were already collected and arranged; so that had his life been prolonged, even for a few years, both these important works would have been finished, and have added largely to the stock of useful science. In the same manner, his 'Engravings of the Bones,' were but the first specimen of a great design which contemplated the accurate delineation of all the parts and organs of the human body. The entire

work, like the portion already published, would have presented many original Views; and, in conformity with his usual practice, all the representations of parts, taken from others, would have been submitted to a strict comparison with nature. The execution of such a plan would necessarily have delayed the progress of the work; but its completion would have been hailed as a great acquisition to Natural and Medical science.

If, therefore, we call to mind the extent of research manifested in the preparation of these elaborate Works, and duly reflect on the time and labour employed, in dissection and experiment, to ascertain and verify their accuracy; and if from what, in each instance, has been performed, we appreciate justly the talent and skill which would have been displayed in their final execution, we cannot but estimate more highly the learning and industry of their author, and more deeply lament the fate which has deprived him of their full reward. Yet brief as was

his course, his life holds forth an animating example to those about to enter on the same career. They may learn from it, how great are the acquisitions which well-directed industry, even in a short life, is able to achieve; what public estimation and encouragement wait upon it; and what prospects of honour and reward open to its view. And should they happily reach the autumn of their days, and reap the full harvest of their toils, they will not withhold a sigh o'er the lot of him, who did not attain to the same maturity of fame, only because he untimely fell ere the summer of his life had passed.

So entirely did Dr Gordon devote himself to the studies and duties with which he was occupied, that, during the first years of his establishment in life, he declined all thought of engaging in medical practice. Such a knowledge of anatomy and physiology, as he was ambitious to possess, demanded an exclusive application of time and talent; and the laborious operations of practical anatomy and experimental research, which, at this period, claimed his attention, combined with the preparation and delivery of his Lectures, furnished abundant occupation, and were quite incompatible with the calls and distractions of medical practice. At his outset in life, therefore, he looked to his duties, as a public teacher, as the means both of reputation and independence, trusting

that success in these would furnish a suitable introduction to medical practice, when either his wishes or his interests might render it desirable. Accordingly, at a later period, his reputation as a man of science, joined to that worth of character and amenity of manners by which he was so peculiarly distinguished, introduced him, during the few last years of his life, without effort or solicitation, to a considerable share of the most respectable practice. By this time, he had mastered most of the difficulties which the earlier stages of his life presented, and his duties, as a public teacher, had become comparatively easy. The prospect too of a numerous family, which depended on his personal exertions, disposed him to embrace more readily the opportunities of practice that now opened to him; and there is little doubt but that a few years would have raised him to a higher station among his medical brethren than is usual at so early a period of life.

The same cruel destiny, which arrested

him in his medical career, closed against him those honours and dignities, to which, almost by general consent, he must at no very distant day have attained. It is pretty well understood, that many persons of great weight and authority in the patronage of the University, looked towards him as one qualified to uphold and advance its reputation; and some of the most distinguished members of that learned Body hailed his admission among them with the most flattering anticipations. Of these, two of the most illustrious ornaments have since followed him to the tomb;—one, * full indeed of age and of honours, but regretted yet less for his varied and profound accomplishments as a philosopher, than for his most amiable qualities as a man;—the other, † cut off, like the friend he mourned, in the prime of his days, and the full exercise of his talents—talents which, by their force and originality, seemed fitted to accomplish great

* Mr Playfair. † Dr T. Brown.

improvements in the sciences to which they were dedicated.

It was thus at the early age of Thirty-two years, after having acquired a reputation deservedly great, and cleared the way to the highest honours and dignities of his profession, that Dr Gordon was attacked by that disease, which, in the brief space of a few days, terminated his earthly career. Through his whole life he had enjoyed excellent health, subject only to those occasional derangements of the alimentary function, which severe literary pursuits, with their accompanying habits, are known often to produce: but these had latterly disappeared. For two or three days previous to the 3d of June 1818, he had complained of lassitude, headach and general uneasiness, for which he was bled on the evening of that day. The two following days he was so much better as to make a short excursion into the country: but on the 6th, the headach, with the febrile symptoms, recurred, and continued

notwithstanding the remedies employed. During the night of the 12th, he became delirious, and on the following morning was attacked with a spasmodic affection of the throat. This affection gradually extended over the whole body, and returned in frequent and violent paroxysms. In addition to the depleting remedies hitherto employed, opiates were now administered under the direction of the late Dr Gregory and Dr Thomson. These abated the spasms and procured some sleep, after which he awoke somewhat refreshed, and perfectly sensible. But the convulsive symptoms again recurred, and continued at intervals, until, at last, his strength was quite exhausted, and he died, without a struggle, on the evening of the 14th of June.

The sensation produced by this sad and unexpected event was such as rarely attends the death of persons the most dignified by character and station: and was altogether unprecedented in that of a private indivi-

dual, whose merit alone had raised him to the rank which he held in public estimation. His rising character in his profession, and the high reputation he enjoyed as a public teacher, had drawn towards him a considerable share of attention: whilst his moral worth, the sweetness of his disposition, and the attractive graces of his person and manners, excited a warmth of attachment in his friends, which few, in any station of life, have the happiness to enjoy. It was this combination of talent and of worth—this union of all that is amiable with all that is estimable in character, which conspired to render the death of Dr Gordon a subject of such deep and general sorrow. Doubtless too, the period of life at which it occurred, and even the suddenness of the event itself, contributed to aggravate this feeling: for the greater the exaltation of our hopes may have been, the more severely do we feel their disappointment; and misfortunes which come upon us after a long season of expec-

tation do not move our sensibilities with the violence of those which more suddenly overtake us.

The last testimonies of respect and regard, which living worth could bestow on departed excellence, were rendered to Dr Gordon in a manner the most honourable to his memory, and most gratifying to his surviving friends. A large portion of the genius and learning of this enlightened Metropolis, as well of the other learned professions as of that to which he belonged, honoured his obsequies by their presence—drawn thither, not to exhibit the outward formalities of sorrow, nor the cold and heartless respect which mere rank and station obtain; but to indulge the finer sympathies of their nature, and 'pay the mournful tribute of their tears' to talents which had excited their admiration, and to virtues which had warmed their hearts.

Among the persons who atttended this solemn ceremony, none bestowed on it greater

interest than the Members of the Royal Medical and Physical Societies, to which belong the greater number of senior students who frequent this University. Of these gentlemen, some had been the friends and fellow-students of Dr Gordon; many were his pupils; and all may be ranked as associates in the sciences which he so successfully cultivated and taught. On the mournful occasion of his death, they assembled in their respective Halls, and passed 'Resolutions' expressive of their admiration of his talents, their sorrow for his loss, and their desire of testifying respect for his character by accompanying his remains to the grave.* Such spontaneous testimonies of regard, offered in the free and generous spirit of youthful feeling, by men just entering on the career of science and usefulness which their friend and instructor had so prematurely closed, attest, in the purest and strongest manner, the estimation in which he was held as a Teacher, and the affection that was borne him as a Man. The

* Appendix No. 4.

Members of the Medical Society, still farther to perpetuate their respect, set on foot a subscription, (confined to those of their own body) to procure a Bust of their lamented Associate to be placed in their Hall; which that excellent artist Mr Joseph is engaged to furnish. *

The senior members of the Profession were not less alive to the merits of Dr Gordon, and to the services which he had rendered to science. At a meeting of the Royal College of Surgeons, 'Resolutions' were passed, expressing the 'strong sense entertained by its members of the zealous and 'successful exertions of their fellow mem-

* Very highly to his own credit, and greatly to the satisfaction of Dr Gordon's friends, Mr Joseph has executed the Model for the Bust: And when it is considered that he had never seen Dr Gordon, nor had any subject to work from, but the excellent Miniature, of which the Engraving prefixed to this volume presents an accurate Copy, one cannot but admire the talent which has enabled him thus happily to transfer to Marble the minute proportions and delicate touches of the Pencil.

ber, the late Dr John Gordon, in promoting the advancement of the science of medicine, and deeply deploring his death, at a period when he was about to reap the reward of his labours.

Nor were these sentiments of respect and regard confined to those of his Profession who were in habits of familiar intercourse with him, and constant witnesses of his meritorious exertions. They were felt as sincerely, and expressed as warmly, by those at a distance to whom his merits were known, and who had the happiness to enjoy his friendship—by men devoted to the same sciences with himself, and highly distinguished in the world by their successful cultivation of them. These gentlemen will, I hope, pardon the liberty now taken in making known their sentiments respecting Dr Gordon, and will attribute solely to my zeal for the honour of his memory, this unauthorized publication of them.

In a letter addressed to Professor Thom-

son by Mr Brodie, he says, 'I do not know 'that I was ever more shocked than by Mr 'Ogilvie's Letter, in which he announced to 'me poor Gordon's death! Had he died 'earlier in life, before his high character 'had fully developed itself; had he lived 'some years longer so as to have been able 'to complete the principal things which he 'himself wished, and which his friends ex- 'pected him to complete in life, we should 'all have sincerely lamented his loss; yet it 'would have affected us in a very different 'manner from that in which it has affected 'us under present circumstances.'

Mr Travers also, in a letter addressed to Professor Thomson on the same mournful occasion, observes—'I cannot withhold from 'you, as the esteemed and beloved precep- 'tor and friend of poor Gordon, my sin- 'cere tribute of condolence on the loss, to 'his associates, if not to the world, irrepara- 'ble, of so excellent a man, and so intelli- 'gent and indefatigable a cultivator of sci-

'ence. Having understood from time to 'time that his health was firm, as it was 'when I had the privilege of his society, and 'having very recently heard from him, I 'was truly shocked at the news of his de-'cease. I shall receive, with the profession 'at large, the particulars of this painful e-'vent, and beg you to accept from me the 'assurance that his loss is considered by all 'his fellow-labourers in London as a great 'public calamity. For myself, I tender the 'unequivocal and heartfelt expression of 'high esteem and admiration for his charac-'ter, and real grief for the event which has 'deprived us of him.'

Neither must I omit the tribute rendered to Dr Gordon's memory by another distinguished physiologist, in a late interesting work. In alluding to an opinion of Dr Gordon, respecting the structure of the skin, Mr Lawrence takes occasion thus to speak: 'I 'cannot omit this opportunity of paying to 'my deceased friend the small but sincere

'tribute of my high respect, and deep re-
'gret for the loss which our science has sus-
'tained in his premature death. His abi-
'lities, acquirements, and zealous devotion
'to science were well known. At an early age
'he had distinguished himself as a Teacher
'and a Writer, and he set the useful ex-
'ample of appealing, in all cases, to nature;
'and admitting no statements which he had
'not personally verified. A brilliant and
'useful career was just opening before him.
'In the present state of Anatomy in this
'kingdom, his labours and example would
'have been singularly useful.'

There is yet another tribute to the memory of Dr Gordon, written with so much truth and feeling, and under circumstances so impressive, that I persuade myself its insertion will not be unacceptable to the Reader. It is contained in a Report of the 'Institution 'for the Education of Deaf and Dumb Chil-'dren,' of which Dr Gordon was a zealous supporter. A general meeting of the Mem-

bers of this Institution was held in the Assembly Rooms about the 25th of May 1818, at which the Report, exhibiting the progress of the Institution for the past year, was read. Towards its close, the Reporter took occasion to quote the following passages from the Article, 'Dumb and Deaf,' written by Dr Gordon for the Edinburgh Encyclopædia, to which reference has already been made. 'The task of education is never, perhaps, 'more truly delightful, than when this unfortunate, though interesting, class of persons are the subjects of it. They unite, in 'general, to singular steadiness of application, the greatest gentleness and docility; 'and expressions of countenance, as cheering as they are unequivocal, continually declare the emotions of gratitude with which 'they receive instruction.'—'We see their 'happiness increasing with their knowledge; 'and when the sublimity of nature is first unfolded to their opening minds, and we mark 'the tear starting into their eyes, we cannot

'but participate in their noble pleasure, and 'rejoice that such emotions can be theirs.'

It was but a few days after this Meeting had been held, viz. the very first days of June, that Dr Gordon felt the first symptoms of that disease, which proceeded so rapidly to its fatal termination. Very soon thereafter, the Report, in a printed form, was given to the public; and in alluding to the passages quoted above—'It is,' says the writer, 'an 'affecting recollection to those who so lately 'listened to this "Report," that the accom- 'plished and amiable author of these beauti- 'ful sentences was present, and witnessed 'the emotions of pleasure with which they 'were heard, by a very numerous audience. 'He was then in the vigour of health 'and youth; rich in the affections of his 'friends; advancing rapidly to the highest 'eminence in his profession; and looking 'forward, probably, to many years of virtu- 'ous exertion, of usefulness, and of enjoy- 'ment. He is now no more! This is not

'the place to enlarge on those qualities, which 'endeared Dr Gordon to his friends in a de-'gree to which it has seldom been the lot of 'mortality to attain. Yet it may be permit-'ted to those, who have so long been asso-'ciated with him in the management of this 'interesting Institution, to avail themselves 'of this opportunity of offering a humble, 'but sincere tribute to the memory of those 'talents and virtues which had already rais-'ed their possessor to so high a rank among 'his fellow-citizens; and which, had it pleas-'ed Providence to prolong his useful life, 'would have numbered him among the 'brightest ornaments of his country.' *

* This Report, which was put into my hands by my friend Dr Maclagan, only while these sheets were passing through the press, was drawn up, I have since learned, by the late Mr Hay Donaldson, Writer to the Signet, who, but a few weeks ago, was prematurely snatched from his friends and society by the hand of death. He was a gentleman not more distinguished for his eminent professional talents, than for the active benevolence of his nature; and was greatly endeared to a large circle of friends by the suavity of his manners, the warmth of his affections, and the purity and integrity of his life.

It now only remains for me to attempt the delineation of a few of the more prominent features in the person and character of Dr Gordon which attracted such general admiration, and endeared him so much to his friends. In stature he was of the middle size, and of a frame slender, but elegantly formed. His person was very handsome and attractive, displaying a countenance at once animated and expressive, a complexion fair and sanguine, with a nose slightly aquiline, light hair, and fine blue eyes beaming with intelligence, and full of gentleness and benignity. No one could look upon him without pleasure, nor without the desire of seeking his farther acquaintance. There was a pensive softness, blended with a kindly expression of feeling in his features, which excited peculiar interest; and a look of intelligence which always commanded respect.

To adopt the beautiful language of an accomplished writer, whose intimate knowledge of Dr Gordon might be received as a

pledge for the accuracy at least of his delineation—'The distinguishing trait in his Manners,—or rather in his Character, of which his manners were at all times but the index and exponent—was to be found, perhaps, in a certain *graceful frankness* and *gay sincerity* of spirit, which at once banished all idea either of pretension or disguise—and, having its root in the manly candour and firmness of his nature, was so tempered by the social sweetness of his dispositions, as to win at once on the confidence of the intelligent, and never to wound, for a moment, the self-esteem even of the most irritable. There never was a man from whom his friends were so sure to hear the truth—and to hear it, even when unpleasant, with the least possible pain, and without the smallest admixture of offence or provocation. His whole character, indeed, bore upon it the distinct impression of singular simplicity and purity; and was felt, by all who approached him, to be altogether without artifice, without littleness, without irritability—and even without the pride which might well have

been excited by the consciousness of so many excellences: For there was about him, if we may so express ourselves, so much of a cheerful facility, and native ease and animation, as at once to invite to familiarity, and make familiarity a delight—a certain bright transparency of soul that disclosed all its virtues, not only without ostentation, but without consciousness of their value—and a fresh buoyancy of spirits which dispelled all the elements of distrust, and kept his heart constantly open to a kind and ready sympathy with all sorts of innocent enjoyment.

'Though constitutionally an enthusiast in the pursuit and admiration of every kind of excellence, the gaiety of his temper and the clearness of his judgment saved him at all times from the hazard of forming exaggerated opinions, either as to the importance of his own pursuits, or the merit of his exertions. His habitual course of thought, indeed, pointed strongly in an opposite direction; and, while no topic was more familiar to him than the

ignorance and indifference of one half of the world as to what occupies and agitates the other, his intimate friends can never forget the pleasant and natural playfulness with which he used to illustrate this position, from the history of his own, and their habits and occupations: And, ardent and indefatigable as he was in the cultivation of the sciences to which his life was devoted, it was easy to see that he valued still more highly the moral gifts or discipline by which life is made lovely; and never forgot how poor a thing is learning, or fame itself, in comparison of kind affections and social happiness. Of that happiness no man ever contributed or enjoyed a larger share. The cheerfulness of his nature—the equal and happy balance of all the powers of his understanding—the large range and variety of his accomplishments, and the sweet pliability of his spirits, fitted him, in an eminent degree, for all the pleasures of society; and, while he reserved his love and confidence for the generous and intelligent, who formed the inner circle of his friends,

he had the utmost indulgence for all ordinary defects and infirmities, and lived easily and kindly with the whole range of his acquaintances.' Hence it was, that in general society, he met always with a gracious and cordial acceptance; and in the more private intercourse of life was honoured with the friendship, not only of our most eminent men of science, but of many of the most accomplished individuals, who shed such a living lustre on the reputation of the Scottish Bar. And hence too it is, that no man has left behind him a name which more often recurs to the remembrance, or is more tenderly cherished by his friends.

Closely allied to that social and benevolent frame of mind, which so eminently distinguished Dr Gordon in his intercourse with his fellow-men, was the sympathy he felt with whatever, in Nature, was beautiful, grand, or sublime. In the eloquent and expressive language of one who has often witnessed and shared his raptures—'If ever there was a being who had a sympathy with

nature, it was her. It was an honest, simple, genuine perception and enjoyment of all her beauties, and of all her grandeur; and of all human occupations connected with her. How have I heard him sing amidst the primroses and bursting larches on Tweed-side! How he lingered, on our walk to Dalwhinnie, to gaze on the solitude of Loch Garry! And how he seemed to expand on the noble banks of his native Findhorn! If this were a mere little personal peculiarity, it would not be worth noticing. But there is a great alliance between genius and a taste for nature; and there is a satisfaction in associating the recollection of departed worth with those material objects which either never decay, or are every year presented to us in fresher renovation.

With feelings thus alive to all the finer emotions of our nature, it was the great felicity of this excellent person to combine the highest principles of honour, and the most manly firmness of character. To a proper deference for the sentiments of others, he

joined always a becoming respect for his own: and, in every action of his life, he held the advancement of his fortune in just subordination to the purest dictates of conscience and truth. The reputation which he so early acquired, was gained by no unworthy arts or pretensions—no mean or selfish compliances—no compromises of principle or of honour. It was the homage spontaneously rendered to eminent talents, steadily and successfully directed to useful and honourable ends, and recommended and adorned by the most engaging manners, and an undeviating propriety of conduct.

In the more private and retired scenes of life, he constantly exhibited those qualities of heart and of temper, which gain irresistibly on the affections, and hold them in willing bondage. His dispositions were frank, generous, and gentle; his sentiments liberal and candid; his affections warm and sincere. His temper was always cheerful, and he often delighted his friends by the ease and playfulness of his humour, and by a happy

turn for imitation, in which he now and then sportively indulged. Possessing, too, a voice rich and harmonious, a fine ear, and great sensibility, he was enabled to chaunt, occasionally, the melodies of his native mountains with sweet and expressive power. Of his character in all the relations of domestic life, it is enough to say, that the virtues and graces, which procured him such general estimation abroad, were still farther softened and refined by the endearments and delights of home: and that, as the cords of wedded love were never more closely drawn than in his union, so were they never sundered with greater pain than by his untimely death.

As a Teacher of Anatomy, the reputation of Dr Gordon stood deservedly high. He possessed a neatness and dexterity of hand, which peculiarly qualified him for anatomical investigations, and a patience and perseverance in pursuit not easily to be tired out, or subdued by difficulties. During the winter Session, he laboured incessantly in preparing the objects to be demonstrated in his

Lectures; and, by his manner of exhibiting and describing them, removed much of the disgust liable to be excited by attendance on an anatomical Course. Without the smallest approach to unnecessary refinement, or affectation of seeming delicacy, he contrived to exhibit parts with such attention to neatness and propriety, and delivered his demonstrations in a manner so clear and interesting, as to render his Lectures not only instructive, but amusing. Of the many great anatomists we have had, few have possessed, in any very eminent degree, the talent for anatomical demonstration. This talent, so greatly admired in Dr Monro *primus*, and in Dr William Hunter, was possessed by Dr Gordon in a distinguishing degree, as will be acknowledged by all who have enjoyed the advantage of attending his Lectures.

As a Lecturer on Physiology, a wider field was opened for the display of his qualifications; and the reputation he acquired affords the best evidence of his success. With clear conceptions of his subject, and just and

comprehensive views, he expressed himself in language so simple and precise, and with so much ease and grace, as to secure always the fixed attention of his audience, and not unfrequently suspend them in silent admiration. His elocution was uncommonly distinct and pleasing, possessing even a degree of musical harmony; and the elegance of manner, which he uniformly displayed, was not the result of study or of art, but the happy effort of good taste improving on the free gifts of nature. Deeply impressed with the importance of the science he had undertaken to teach, and ardent in the study and improvement of it, he was anxious to communicate to his hearers, not the knowledge only which he possessed, but a portion of that real love for the science with which he was himself animated. His pupils came therefore to his class, not with the desire simply of being taught, but the expectation of being gratified—not merely to perform certain stated duties, and pass an hour in listless indifference, or perhaps settled dis-

gust, but to acquire knowledge in a manner the most inviting, and bear away with them a love for the studies in which they had been so agreeably occupied.

These high accomplishments as a teacher were aided and enforced by that principle of method and order, which pervaded all his pursuits, and regulated all the habits of his life. His duties were always so well considered, and the times and modes of executing them so correctly arranged, and so punctually adhered to, that he was enabled to get through his various occupations without any appearance of hurry or difficulty; or without encroaching on the time allotted to the enjoyment of society with his friends. He never needed the aid of any adventitious arts to secure the attention of his audience; nor was he ever seduced, by his capacity for animated eloquence, to depart from the chaste and didactic style which his good taste prescribed. His Anatomical Lectures were delivered from short notes, indicating merely the leading heads of the subject, and the order to be ob-

served in treating it. His physiological Course was given from more copious notes. These, however, were written in so free a style, and delivered in a manner so easy and agreeable, as to impart to them nearly all the freshness and interest of extemporary composition. His delivery, on all occasions, was removed, as far as possible, from that dull, mechanical method, into which many teachers are so apt to fall—in whom, the organs of speech seem to act more from habit than from thought, and the tones of the voice invite less to attention than repose. With Dr Gordon, on the contrary, the constant infusion of thought and feeling bestowed on his facts a lively interest, and impressed on his reasonings a new and original glow. Even the information obtained from foreign sources, seemed often with him to pass through a process of assimilation, and acquire the charm of novelty, either from the different aspect under which it was surveyed, or the new views it was employed to suggest. He was much in the practice of referring to

the sources whence he had drawn his information, as well to give authority to his statements, as from an honest desire to do justice to his predecessors and contemporaries, and assist to the utmost the future studies of his pupils. These endeavours and exertions were duly appreciated by them, and repaid in the way most gratifying to him—by their punctual attendance, and uniformly respectful and decorous conduct. Young as he was in reality, and younger still as he seemed in appearance, there was an interest excited by his presence, which, from his first effort as a public Teacher, arrested and held fast the attention of his pupils; whilst an uniform display of talent, a conscientious solicitude to instruct, a manner dignified yet simple, and conduct unaffectedly friendly and kind, won their admiration and esteem. Of this, many testimonies exist among his papers, some transmitted to him during his life, and others sent to his friends since his lamented death. I shall venture to introduce one or two of

these testimonies, as illustrative of the remarks I have made. They display the opinion entertained of Dr Gordon, as a Teacher, by those not certainly the most learned in the subjects discoursed of, but whose minds were the least preoccupied, whose interests were the most concerned, and whose judgments, therefore, may, at least, be deemed sincere. The first I shall give, is a letter addressed to Dr Gordon in April 1813, after the conclusion of his Winter course. It was written by a gentleman who chose to conceal his name, and is still unknown; but whose knowledge and discrimination evidently qualified him to appreciate the merits of his instructor.

. . . . . .

Sir—I must indulge myself in thanking you for the excellent course of Lectures lately concluded. Had any occasion offered of doing so personally, I should have failed in an attempt to express my sentiments, and therefore am better satisfied with the method I now take, though I am

'aware you will be apt to smile at it as a 'specimen of self-conceit. It would indeed 'be a sort of impertinence in the Learner to 'compliment the Teacher on his extensive 'reading, industrious research, or correct 'opinions; for these he cannot be supposed 'to estimate. If he is inclined to infer, from 'the ready and unostentatious reference to 'authors and experiments, that a large ac-'quaintance has been formed with both; and 'from a manner of reasoning, which appear-'ed sound and candid, that no error has 'been advanced, he may more properly ex-'patiate on this to those who are seeking 'the same sort of knowledge.

'But there are points on which the pupil 'is more competent to judge. One cannot 'mistake or fail to perceive the intention and 'wish of *teaching*; and, in order to that 'end, the economy of time by selection of 'topics, the successful aim at distinctness, 'and the uniformity of these exertions. All 'who have paid even as imperfect attention

'as myself, must understand and value 'them.

'And perhaps none of the characteristics, 'which I have glanced at, would have induc-'ed me to address you, had it not been for 'others which, I believe, are still more rare. 'I confess I have been more gratified by the 'correct, appropriate, and simple style which 'you have formed,—to which you do justice 'besides in the utterance; but most of all, 'by that real dignity which you never com-'promise, either by affectation or by levity. 'It is pleasing to observe, how entirely this 'commands the respect of your audience. 'You will also have to calculate, with last-'ing satisfaction, on the *moral* influence of 'lectures, which are lessons of genuine and 'manly refinement, and contribute support 'to those religious principles which exalt us. 'Such an influence, applied, as it is by you, 'in the most judicious manner and measure, 'and when weighed, not only by itself, but 'against its pernicious contrary, will be 'found of high value.

'I have ventured quite far enough with 'these remarks. Allow me to conclude 'with the hope, that, whatever alteration of 'materials and *arrangement* may be found 'expedient, you will not alter the *spirit* and 'manner of your lectures. I can offer no 'better wish, than that *these* may be quite 'unchanged, if, at some distant period of 'your useful labours, I should again have 'the pleasure to be a hearer.

'I think you will perceive that I do not 'write insincerely, but I should have writ-'ten, probably, with less freedom, and the 'motive would be more dubious, were I to 'add my name to this letter. I therefore 'remain, Sir, with a full share of that re-'spect and regard, which, I believe, are felt 'more or less by all—

'One of your Class.

'*Edinburgh*,
'*April*, 1813.'

That the respect and regard, thus render-

ed by an individual, were shared in common by his fellow-pupils, we have a pleasing testimony in the fact, that a short time before the close of the Course, a meeting of the Class was called to consider of some appropriate means of testifying their approbation of Dr Gordon's zeal and ability as a teacher.

A knowledge of the intended object of this meeting reached Dr Gordon, and, though highly flattered by such a spontaneous mark of regard from those whose approbation he was most anxious to obtain, he yet felt, that, in the relative situation of the parties, it was a subject of considerable delicacy, and might be exposed to much misconstruction. Disdaining, as he did, all unworthy means of advancing his fortune, and fearful lest even a suspicion of such conduct might attach against him, he conveyed to one of the gentlemen concerned, his wish that the proposed object of the meeting should, for the present, be relinquished. As the time and place of the meeting had, however, been previously

fixed, it was held accordingly, and the 'Resolutions' adopted were transmitted to Dr Gordon by the gentleman* who presided on the occasion.

These Resolutions expressed in substance the high respect of the class for Dr Gordon's talents, and the desire of its members to have testified their approbation of his labours, by presenting him with a piece of plate; which design they relinquished only in deference to his private sentiments. On the following day, Dr Gordon, in reference to these Resolutions, addressed his class from a written paper, in the following terms:—

'GENTLEMEN,

'My feelings will not permit me to 'enter on the proper business of this meet-'ing, until I have returned you my very 'sincerest thanks for the communication 'which I last night received from you, 'through a highly respectable member of 'your body.

* Mr P. Sandberg.

'How gratifying this communication has been to me, I will not attempt to express; nor can you conceive the pleasure it has given me, unless you had already been placed in circumstances like mine. When you have entered on the active duties of your profession, and when your all depends on your own exertions—when the first and dearest object of your ambition is the approbation of good men!—and when you shall at last have actually enjoyed a share of that approbation—then, and then only, will you have experienced in yourselves those feelings of satisfaction which you now so kindly bestow upon me. I know not that I can wish you any greater blessing under Heaven, than that such should soon be your objects, and such your early reward. While I express my gratitude, Gentlemen, for the flattering opinion you have been pleased to entertain of my humble labours, I must, at the same time, return

'you thanks for the very agreeable manner 'in which that opinion has been conveyed, 'and for the very delicate regard you have 'shown to my private sentiments, in relin- 'quishing your original intentions, with re- 'spect to me, on this occasion. I am aware 'that you cannot, perhaps, perceive those 'views which have prevailed with me on this 'subject; but it would not become me to 'state them publicly. As it is, you have 'presented me with a gift, the most accept- 'able, in a manner the most delicate and 'agreeable. I am proud to possess it; and, 'be assured, it shall be most sacredly pre- 'served.'

On this simple and touching communication, I shall not venture to remark; but there is one letter more, addressed to Dr Thomson, soon after Dr Gordon's death, from which I cannot deny myself the satisfaction of making a short extract. It was written by Dr George Barclay, a young

physician of Aberdeen, in which city he had settled with the fairest hopes and the most flattering prospects of success. It derives a melancholy interest from the fact, that its amiable and accomplished author, like the friend and preceptor whom he so pathetically mourns, has himself since fallen a victim to Typhus fever, acquired in the anxious exercise of his professional duties.

'My Dear Sir,

'It is with unfeigned sorrow that I 'sympathize with you upon the loss of our 'excellent friend Dr Gordon. I did not 'hear of his illness until I received an ac- 'count of its fatal termination; and I need 'not say how I was shocked by the melan- 'choly intelligence. Genius and applica- 'tion were so well mingled in the constitu- 'tion of his mind, that, with regard to the 'provinces of science to which he attached 'himself, expectation was almost unlimited; 'and his milder virtues can never be thought

'of by those who had the pleasure of his ac-
'quaintance, but with a melancholy admi-
'ration. For my own part, I always placed
'him before my eyes as a spotless example
'for my imitation, and really felt as if I had
'been deprived of a father, when I heard of
'his death. I know, my dear Sir, how your
'heart must ache in speaking or thinking up-
'on this melancholy subject: but I hope
'you will excuse a grateful pupil for thus
'expressing his sorrow at the loss of so ex-
'cellent a preceptor.'

If such sincere attachment to Dr Gordon, and such deep sorrow for his loss, were felt and expressed by those whose acquaintance with him was casual and of short duration,—what must have been the feelings of others, connected with him by friendships of longer continuance, or by still nearer and more endearing ties! These I shall not attempt to describe; for language does but poorly express our sorrowful emotions, and throbs of

sadness find but an imperfect utterance in words. There is, however, a redeeming grace in virtuous sorrow, which lightens the gloom of affliction, and disposes the mind to accept, with thankfulness, the hopes and consolations which religion and reason supply. And as time removes, to a greater distance, the events which troubled the soul, we look back upon them with less and less emotion, 'till at length they become so softened to our view as no longer to agitate our feelings, but awaken only that hallowed remembrance, which sweetly stirs the affections, and purifies and exalts the heart.

APPENDIX.

APPENDIX NO. I.

THE Committee of the French Institute, appointed to report on the Anatomical labours of MM. Gall and Spurzheim, consisted of MM. Tenon, Portal, Sabatier, Pinel, and Cuvier. Their Report was presented to the Institute, April 15th, 1808, and adopted by the Class. It was translated and published in the Edinburgh Medical and Surgical Journal for January 1809. Its Conclusions are expressed in the following terms.

"1. Finally, it appears to us," say the Committee, "that Drs Gall and Spurzheim have the merit, not of having discovered, but of having recalled to the attention of Physiologists, the continuity of the fibres which extend from the Medulla Oblongata into the hemispheres and into the cere-

bellum, which Vieussens first detailed; and also the decussation of the filaments of the pyramidal eminences described by Mistichelli, by Francis Petit, and by Santorini, but with regard to which some doubt had been entertained.

"2. That they are the first who have distinguished *two* orders of fibres, of which the medullary matter of the hemispheres appears to be composed:—the one of which diverges from the peduncle, while the other converges towards the commissures.

"3. That, by uniting their observations with those of their predecessors, they have made it very probable, that the nerves called Cerebral ascend from the Medulla Oblongata, and do not descend from the brain; and that, in general, they have very much weakened, not to say overturned, the system which makes all the nerves come originally from the brain."

APPENDIX, NO. II.

Brief Summary of Professor Reil's Labours on the Structure of the Brain and Nerves.

THE first results of Reil's labours were published in Gren's new Journal of Physics for 1795 (Neues Journal der Physik, Erst. Band. 8vo, Leipsig, 1795), and his subsequent discoveries, says Dr Gordon, form the subjects of no fewer than ten separate Dissertations, which will be found in the volumes, from 1807 to 1812 inclusive, of the periodical work entitled Archives of Physiology (Archiv für die Physiologie) edited by himself and Authenrieth at Hallé.

In 1795, appeared, in Gren's Journal, Reil's first Memoir on the Structure of the Brain and Nerves, exhibiting a general view of the singular arrangement of parts he had discovered in those organs, and which his subsequent investigations enabled him to trace more minutely, and amply to confirm.

In 1796, appeared his well known work on the Nerves, entitled Exercitatio Anatomica de Structura Nervorum, fol. Halæ 1796. In this work,

by his ingenious application of Chemical Menstrua, he succeeded in disclosing circumstances respecting the nervous fibrils themselves, as well as the sheaths containing them, which had eluded the observation of all former anatomists.

After the publication of this work, he resumed his investigations into the structure of the brain; and in 1807, published, in his Archives of Physiology, an Essay on the Cerebellum, exhibiting very minute descriptions of that portion of the brain viewed externally, and illustrated by engravings.

This Essay was followed by another in the same volume, describing the manner in which the strata come off from the different parts of the Cerebellum, and the general fibrous Structure of that organ. Also, in the same volume is a very interesting paper, in which the minute fibrous structure of the lobes, lobules, and different orders of strata are described and illustrated by excellent engravings.

In 1809 he finished his description of the Cerebellum, by a few observations contained in a short essay in the volume of Archives for that year.

In the same volume (1809) he published a

long essay on the minute structure of the Cerebrum or Brain-Proper. This essay commences with some observations on the method of preparing and dissecting the parts, which he had followed with success; and he here pronounces the method of investigation, adopted by Gall, to be inadequate. Then follows a complete description of the apparent fibres of the Cerebrum, which does not at all correspond with that given by Gall.

In the same year, appeared an additional paper on the Structure of the Medulla Oblongata, and the parts situated behind the Pons Varolii.

Lastly, in 1812 appeared three additional papers—the *first* on the Anterior Commissure of the Brain-proper—the *second* on the Septum Lucidum and its Ventricle, on the Fornix, and on the Lateral Ventricles—and the *third* contained some additional observations on the Structure of particular parts both of the Cerebrum and Cerebellum.

APPENDIX, NO. III.

A Classification of Excretive Secretions—founded on Anatomical Characters, from Dr Gordon's Outlines of Physiology, page 67.

1. Those Secretions in which the Excreted Substances are poured out through a Tube or Tubes, formed like a Vein by the union of lesser tubes within the substance of the Organ. Ex. The Lachrymal Gland; the Parotid, Submaxillary, and Sublingual Glands; the Liver; the Pancreas; the Kidneys; the Testes; the Prostate Gland; Cowper's Glands; and the Mammæ.

2. Those in which the Excreted Substances escape by Pores of various sizes, the communications of which, within the Organ, are not known. Ex. The Skin; the Meibomian Glands, and Caruncula Lachrymalis; the Ceruminous Glands; the Labial, Buccal, Lingual, Palatine, Laryngeal, and Pharyngeal Glands; the Tonsils; and the Glands of the Alimentary Canal.

3. Those in which the Excreted substances cannot be perceived to escape either through Tubes or Pores. Ex. Serous Membranes;

Synovial Membranes; Membranes of Internal Canals and Passages; Arachnoid Membrane; Surface of the Ventricles of the Brain; Parts secreting the Humours of the Eye; Parts secreting the Fluids of the Labyrinth; the Air-cells of the Lungs; the Thymus Gland; the Renal Capsules; and the Ovarian Vesicles.

APPENDIX, NO. IV.

Proceedings of the Royal Medical and Physical Societies of Edinburgh, on the occasion of Dr Gordon's death.

AT an Extraordinary Meeting of the Medical Society, held Tuesday the 16th June 1818, it was moved—

"That the ROYAL MEDICAL SOCIETY of Edinburgh, contemplating the heavy loss which the Medical world in general, and the School of Edinburgh in particular, have sustained in the death of Dr Gordon, their late distinguished Associate, and anxious to demonstrate its high

sense of his zeal and success in the prosecution of those important branches of Medical Science to which his talents were especially directed, do record, in its Minutes, this memorial of the deep and sincere regret in which its Members unanimously sympathize.

"That the Society, participating in the general gloom, which this mournful event has occasioned, do request permission, as a testimony of respect to the exalted character of the late Dr Gordon, to attend his remains to the grave.

"That a letter to this effect be addressed to the Relatives of Dr Gordon, in the name of the Society, equally expressive of its condolence, and of its gratitude for the many and substantial benefits, which it has received from him during his short but brilliant career.

"That Dr Beilby be appointed to transmit, in a letter to the Relatives of Dr Gordon, the Resolutions of this evening."

At an Extraordinary Meeting of the Royal Physical Society held on the 17th June 1818, it was moved—

"That the ROYAL PHYSICAL SOCIETY deeply lament the great public and private loss, sustained by the death of Dr John Gordon, Lecturer on Anatomy and Physiology, and Honorary Member of the Society, in the prime of life and fulness of utility.

"That the services, which, at so early a period of life, Dr Gordon had already rendered to the science of medicine; the vigorous talent and unwearied zeal which, as a public teacher, marked every step of his short but brilliant career; joined with the urbanity of his mannners and the kindness of his disposition, must ever cause his memory to be most highly and justly respected.

"That, impressed by these considerations, the Royal Physical Society offer their sincere tribute of sympathy to the family and friends of Dr Gordon; and, as a mark of their respect, re-

quest permission to attend the funeral of so distinguished and lamented a member of the Society.

"That Dr Maclagan be deputed to arrange with the Relatives of Dr Gordon, in what manner the Society shall attend the funeral, most agreeable to the feelings of the family."

APPENDIX, NO. V.

List of Works Published by Dr Gordon.

1. A System of Human Anatomy. 8vo. vol. I. Edin. 1815.

2. Observations on the Structure of the Brain, comprising an Estimate of the Claims of Drs Gall and Spurzheim, to Discovery in the Anatomy of that Organ. 8vo. Edin. 1817.

3. Outlines of Lectures on Human Physiology. 8vo. Edin. 1817.

4. Engravings of the Skeleton of the Human Body. 8vo. Edin. 1818.

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